

April 5, 1979

A McGraw-Hill Publication

25 Issues per Year

AVIATION

The Oldest American Aeronautical Magazine



You can hit the top with men like that!

The Berliner-Joyce ships, and the entire engineering staff are seasoned by years of outstanding accomplishment.

First, look at the engineering staff:

As Chief Engineer, Frank S. Hubbard (Glass Tech) brings a wealth of experience, coming directly from the responsibility of executive head of the Technical Department of Curtiss.

And standing beside him as Chief of Research is Wilkins H. Miller (Ericsson, Missouri and M.L.T.) an outstanding aerodynamic expert, designer of the wind tunnels of Massachusetts Institute, lately in charge of Research Laboratory at Curtiss.

DUNIH AND CONSTRUCTION

William West, Jr. best known as the design engineer on the most successful Curtiss models, including the Schneider Cup and Pulitzer Trophy racers. Then he went to Chance-Vought and now to Berliner-Joyce as Chief of Design.

Earl P. Olson (Rosenauer Polytechnic) was in charge of Structures. He was in charge of the propeller department at Curtiss, later made head of Curtiss Standard section.

As factory superintendent, Thos E. Pitt (English Univ.) brings a wealth of experience from the same organization with the No. 1 Aircraft Factory at Philadelphia.

BACK OF IT—

Henry Berliner (Mun. for Tech) was the designer and builder of the Berliner helicopter and monoplane, and president of the disbanded Berliner Aircraft Company. He becomes Vice-President of Berliner-Joyce in charge of Production.

Tommy N. Joyce (Babu Poly) and Joseph Lurey is internationally known as test pilot for the Army during the war, testing practically every type of plane commanded by the Allied and Central Powers. Late Washington representative of the Curtiss Company, and then sales manager for Chance-Vought. He is Vice-President in charge of Sales.

Gathering this truly unusual technical and manufacturing staff together, stands W. W. Moss, formerly Vice-President and Controller of Curtiss, who is President of the new Corporation.

THE FUTURE

What do you expect of such an experienced and balanced staff as this? The B-J ships now in design promise to set new standards in aviation.



New Quarter-Million dollar plant now building at Baltimore

The Result of Unified Design - **The ARGO**

True, clear, responsive, as Argos in the air seems for more than a thing of metal, wood and fabric. Rather does she become a part of her pilot's body.

Does she call for speed? It's fast to command—225 miles per hour. Does she call for agility? Like an eagle. A well maneuvered, a great bird. She responds to her pilot's thoughts as she would her own. Her pilot's every thought.

By all means, for fun or profit, don't will the plane be a part of you.

AA

AA

Perfect team work is the secret of success. And team work explains the Argos. A ship built for her engine. An engine built for the ship. The Argos is the result of the perfect team work of one organization. Designed for each other to work in unison, so well that the record room is increasing. Here is present ship performance in a commercial plane at a price that is changing many ideas of airplane values.

916
HESS-WARRIOR
Air Craft Engine

The ALLIANCE AIRCRAFT CORPORATION, c/o Alliance, G.

Peru relies on Mobiloil in conquest of the Andes



Krebs Zeppelin, powered with Wright Whirlwinds, are used along the Great Andes Line to Iquitos, Peru. The power shown is one of their powerful planes being tested with Corgie's Method.



VAST regions in South America, fabulously rich in natural resources but hitherto practically inaccessible, are now being exploited through the rapid development of commercial aviation.

The Peruvian Government was among the first to take advantage of the immense opportunity offered by this new means of transportation. Regular air lines now connect Lima, on the sea coast, with distant island points lying beyond the towering Andes and across hundreds of miles of trackless forests.

The mailer going from Lima to Iquitos, near the headwaters of the Amazon, covers

comfortably in less than 24 hours a distance which formerly required weeks of tedious travel by rail, marmochis, mule-back and river boat.

Other great air lines all over the world rely on Mobiloil for dependable lubrication of aircraft engines, just as famous pilots and most aircraft manufacturers have done since the very beginning of aviation history.

You will find Mobiloil on sale at or conveniently near every airport in the world.

VACUUM OIL COMPANY
Makers of high-quality lubricants
for all types of machinery



the New

Mobiloil

THANK YOU for visiting AVIATION

AIRCRAFT DEALERSHIPS

Aircraft dealerships offer the same sources of definite and enormous profits as did the early automobile franchises. Provided, of course, that the proper dealership be selected. The Flamingo is sold under two merchandising plans. One for established dealers, similar to the automobile franchise plan. The other an arrangement made by dealers, or those not now engaged in aircraft marketing, which involves no preliminary commitment.

The following facts concern the advantages of Flamingo dealerships:

1. Full options profits will shortly demand all social aircraft licenses because of the practical absence of fire hazard and the greater safety factor.
2. Transport operators prefer civilian aircraft because of its negligible maintenance and depreciation costs.
3. The simplified fabrication and production methods employed by the manufacturer of the Flamingo permit its sale in the same price and performance range as the old types of construction.
4. The Flamingo is a transport plane second to the present supply. This is true of the larger type of sports and training ships. The market for transport planes is of much wider and more diversified scope, offering under and more attractive profit margins to dealers.
5. In the field of transport planes the Flamingo stands pre-eminent in adaptability because of its adaptability to practically any class of service, its low maintenance and depreciation, its distinctive economy of operation—is short, its unquestioned utility.
6. The Flamingo market will always be stable. Alert departments of engineering and commercial research guarantee that Flamingo design and merchandising methods will always be in advance of competition.
7. The experience and presence of twenty-three nationally known aircraft manufacturers and the foundation of the Metal Aircraft Corporation of Cincinnati.
8. The Flamingo has an all-metal high-wing cabin monoplane comfortably accommodates six passengers and pilot—powered with either the Pratt & Whitney "Hornet" or "Wasp" engines—cruising at 115-120 mph—top speed 132-135 mph.
9. A request on your letter-head or a personal visit to our offices at the All-American Aircraft Show, Detroit, April 6-11, will bring complete information on our plans of merchandising and dealership.

ALL METAL *Flamingo*

METAL AIRCRAFT CORPORATION
OF CINCINNATI, OHIO
LUNKEN AIRPORT

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An Air Metropolis is Determined by Basic Economic Factors

In the last analysis aviation is mainly the ultra-modern in fast transportation. Its greatest service is performed in linking communities and cities that are far apart. The air transportation center will be that city which is the hub of vast areas.

"Nearest by Air To Everywhere"

Business will be good while where
this country is concerned. It is the natural
result of increasing demands at present, if
you respond decisively to business
and more than twice the field for you.

**Not just a city
but an empire**

Kansas City's advantage over other centers
lies in its unique geographical position.
Within its natural boundaries it is situated
at the junction of two great trans-continental
highways, so any mail may easily
be handled by air or rail. In addition,
Kansas City is the center of all the area
of the states situated in central America,
so that the city can profit greatly
only as an outlet for many products.

- Outstanding factors in
Development of Kansas City
1. Center of Transportation.
 2. Close-in Airport - 1½ miles
from business section.
 3. Economy of Production.
 4. Center of Market.
 5. Ideal Weather Conditions.

Chamber of Commerce of

KANSAS CITY

Kansas City, Mo.

Industrial Committee, Room 41
Chamber of Commerce, Kansas City, Mo.

Please send me without obligation "The Book of Kansas City Facts." I am especially interested in
information on the following subjects:

Related Production Data Air Transportation Flying Schools Aircraft Markets

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Nature of Business _____

State _____

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...a new field with new
untried problems
nothing can guide you
but EXPERIENCE

At its since
War Time!

The H. H. Robertson
Company has been de-
signing and building more
than one-half of the
steel-frame buildings now
standing in France.

This photograph shows a
typical hangar under construction
near Paris, France. The
design was made by
Architects of H. P. M.
(Robertson Products
Steel.)



ROBERTSON

Has the Experience

Hundreds of strange and bewildering new questions confront you when you build a hangar.

- Shall you cover it with unpainted metal roofing and siding and take a chance on rust destroying it?
- Or shall you go to the other extreme and tie up thousands upon thousands of dollars in a hangar of heavy construction?
- Or what about this RPM material that is a happy medium between the two extremes?
- And shall you get your ventilators, or take a chance on the motor exhaust fans getting out by themselves without hurting anyone?

H. H. ROBERTSON CO. - PITTSBURGH, PA.

ROBERTSON



THANK YOU for reading AVIATION



A New-Day Conception of Safety and Performance — by Nicholas Beazley!

Picture a low-winged monoplane, streamlined for grace and speed—eager to charge straight up a sunbeam!

Step into this plane and take off—with a very short run. In a few seconds you are in the air—*in one minute you are 1,200 feet skyward, in eight minutes 8,000 feet. Then forward, you sweep the sky at 105 miles an hour.*

You are in the Barling NB3!

All metal structure gives unbelievable strength to this new, low-winged monoplane yet it is lighter by many pounds than other planes of equal ability. Fuel is as narrow, it consumes no more fuel than a small motor car! Power it has

in abundance—from a small 60 horsepower Le Blond Engine. Performance with this small power plant far exceeds that of the average ship of this capacity with twice the horse-power. Steadiness? When you fly the Barling NB3 you will believe Elliott White Spring's remark that "Anyone not blind or minus both arms can fly". Unlike the average small ship, it does not require an experienced pilot—because of its patented wing construction and the advanced method of applying the dihedral angle. Hands off flying with perfect ease—even in rough air—no tail at all in the NB3. And you land like a feather floating to rest.

Safety has been assured by eliminating wires, turnuckles and other lesser parts. The U-spar wing has no point of vulnerability. This construction, coupled with exceptional maneuverability, makes the NB3 unusually reliable.

Most surprising of all is the price. The only all metal structured, three-place monoplane in the United States for less than \$10,000. The Barling NB3 is yours for only \$3,600, f.a.w.c.

PERFORMANCE DATA: With useful load—813 pounds.... Top speed—105 miles per hour or over.... Cruising speed—87 miles per hour.... Landing speed—50 feet.... Absolute ceiling—15,000 feet.... Climbing—3 hours or 835 miles.... Climb to 12,500 feet—45 minutes.

SPECIFICATIONS: Span—32 ft. 6 in.... Chord—5 ft. 2 in.... Area, Wing—1591 sq. ft.... Area, Tail surfaces—25 sq. ft.... Dihedral—5 degrees.... Length—21 ft. 6 in.... Height—6 ft. 10 in.... Weight—650 lbs./empty.... Total weight—1,310 lbs. (loaded).... Useful load—613 lbs.... Wing loading—3.8 lbs per sq. ft.... Fully loaded with pilot, two passengers and full of gas and oil.

EQUIPMENT: Dual Control.... Adjustable Pilot Seat.... 24x3 SS Tires.... Wings used for navigation lights.... First Aid Kit.... Fire Extinguisher.... Dash Carburetor Choke Control.... Dash Carburetor Altitude Adjustment.... Altimeter.... Thermometer.... Oil Pressure Gauge.... Oil Temperature Gauge.... Air Speed Indicator.... Dual Ignition Switch, front and rear.... Gasoline Gauge.... Weather Books and wings.... Left-hand 60 h.p. Engine.... Engine Stop.... Wood Propeller.... Cockpit Cover.

There are still several territories available to financially responsible distributors who can qualify to handle this *New-Day Plane*. All inquiries should be addressed to our Manufacturing Division.

NICHOLAS BEAZLEY AIRPLANE CO., Inc.
Manufacturing Division
MARSHALL, MISSOURI

BARLING NB 3 Monoplane

PERFORMANCE

MONOPLANES CESSNA

Two planes take off... they enter alike... they meet, pay back—the same destination.
They're on their routes—crossing over the same K-T line.
But look! One is rolling steadily ahead at the other's left turn point.
It's CESSNA'S wing, an example before, lesson to be lost, going along.
Then it takes away from the distant ship—and there, hours later, the report comes true.
"The CESSNA landed first, far on the lead!"

That's the story of CESSNA PERFORMANCE—repeated almost daily wherever Cessna flies—it's the story of Earl Cessna and his entry from New York to the Coast, the story of Stearns in Illinois, and many others,
—and through it is woven the story of Cessna. Cessna Aircraft Company Plane Builder has a long record of success in aircraft racing, having won the annual 100-mile race at Cleveland 16 years ago—but what did Broke the Immortal CESSNA of today—he didn't mind!
But Cessna Performance today is proof that there is no substitute for experience, and these years of experience have made the CESSNA—**Master of All**

THE MASTER OF THEM ALL.

Cessna **SNC**
A Master's Expression

All new Cessna Models will be shown at the Detroit All-American Aircraft Show. We'd welcome you at our booth—and gladly tell you the full story of Cessna Performance—why the Cessna, Horse Power for Horse Power—as from 30 to 20 miles per hour faster.

CESSNA AIRCRAFT COMPANY
WICHITA
U.S.A.

THANK YOU for visiting AVIATION



THE BERRYLOID FLEET NO. TWO

Fokker S-2, French Gray, Black and White Metal, Berryloid colors is a specification suggested by the Cessna Society and presented this Fokker Super-Tri-Motor



FOKKER SUPER TRI-MOTOR
and
Berryloid
AIRCRAFT FINISHES

BERRY FINISHES *Standard* on all FOKKERS



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IN THE MARKET BY BERRY
AND OTHER LARGE
USER OF BERRYLOID

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PROGRESSIVE - AIRCRAFT - FINISHES

BERRY BROTHERS
Varnishes Enamels Lacquers
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Number Two of a Series
of Fact-Statements Re-
garding a New Industrial
Leader—Great Lakes
Aircraft Corporation.

Management

AN INSTITUTION is the lengthened shadow of the men responsible for its policies and product. Sound management is the most important single factor in the successful conduct of any business.

Recent announcements regarding important additions to the executive personnel of Great Lakes Aircraft Corporation have more than ever convinced the aviation world of the certain purpose underlying its development. The ability to attract executives of this type is in itself a

significant measure of any industrial organization. The broader scope now offered to their respective talents has raised unusual expectations with regard to new vision in design, new quality and performance of product.

The respect which past accomplishment has already won for these commanding the active management of this Corporation will be markedly increased by the results of their current activities in the interest of safe, fast air transportation.

GREAT LAKES
CORPORATION

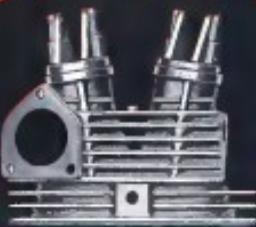


AIRCRAFT
CLEVELAND

Military and Commercial Airplanes - - - Seaplanes and Floats - - - Aluminum Alloy Parts

Cylinder Head

made of
BOHNALITE



A Master Part by Master Craftsmen

Here is a new cylinder head made of Bohnalite which has surprisingly greater strength. It is a particularly fine example of the best example of scores of safety aircraft parts made by Bohnalite experts.

Bohn patterns are models for exactness and precision. For years Bohn pattern makers have been drilled in aircraft dimensional accuracy and the thoroughness of their training is reflected in Bohn quality castings. Bohn castings are better because they are finer.

Journal Division

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A Valuable Book

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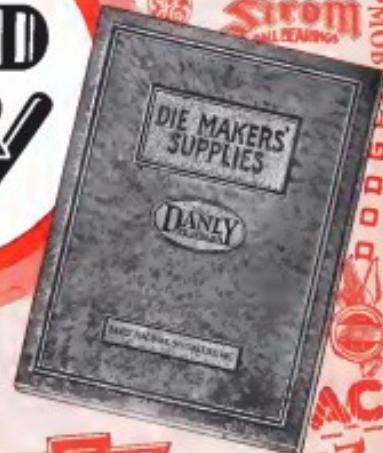


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Don't miss it!

DON'T miss Spalding's booth at the International Aircraft Show in the Exposition Hall at Detroit, April 6 to 13.

Here you'll see the greatest variety of aviation equipment ever exhibited in so compact a space. Seats, boots, goggles, planes, helmets, jackets, etc., etc., and et cetera.

Remember—they've been many developments in equipment as there've been in engines or planes.

Remember—you'll see these up-to-the-minute developments at Spalding's booth.

Don't miss it!

A. G. Spalding & Sons
6130

AVIATION EQUIPMENT

THANK YOU for visiting AVIATION



I have no fear

WHEN the sun wades to the dock, and breakneck lime tags pull my floating world away, I know that no whine of the sultry deep sea gods can confine my passage, for I recall a thousand other safe crossings by this gigantic liner and her sturdy sisters. ¶ When I toss my bag to a greening porter, and great wheels flush their sparks from singing rails, the unheard murble of a thousand other mains assures the safe arrival of this—their brother. ¶ When my finger tightens on the wheel and the speedometer dashes up to 76, I fear no fury of river parts, for the wind whistles back the message that a million others have done—and do—the same. ¶ And when I venture into the air, or watch those I love and cherish slip up toward the stars, the knowledge that the engine bears the name of Continental and is bred of a line that has been synonymous with dependability for upwards of a quarter century, that knowledge, I say, stills the rush of the winds and dwarfs into insignificance the vast, vacuous spaces below—and I have no fear.

Continental Motors Corporation, Aerautical Division, Office and Factory: Detroit, Mich., U. S. A.

Continental Motors

SAFE STRONG SWIFT

To fly a Lockheed

Vega is more than to fly the world's fastest commercial plane! It is to fly with a new feeling of confidence finding full justification.

ification is a correctness of design that places behind that speed tremendous safety factors achieved through rugged construction. Safety, Strength, Speed... all these, in Lockheed, unite to establish a criterion for RELIABLE SERVICE that Lockheed alone can equal.

Lockheed Aircraft Company,
Los Angeles, California

Waco Air Express, Type Certificate No. 881
Whiteland Vega, Type Certificate No. 49
Wayne Vega, Type Certificate No. 59

A new Lockheed, THE EXECUTIVE, will be exhibited for the first time at the Detroit Show. Inspection by business executives is invited. Complimentary aeronautical services will be afforded at the exhibit to those wishing to send delegations.

LOCKHEED

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**ALL IN THE DAY'S WORK**

THROUGH combine of rain, fog, deer and snow, TP Aero Motor Lubricating Oil keeps the engine running smoothly. It provides a margin of safety when unexpected weather conditions mean extra hours in the air.

TP Oils are the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are produced from pure paraffino-base crude by a process for which patents are pending.

This process has marked advantages over other methods. It removes all the paraffine wax, while preserving all the lubricating bodies in the crude. There is positively no blending of light and heavy oils to produce various viscosities.

In terms of performance this means uniform viscosity at all temperatures, minimum carbon deposit and friction trouble from fouled spark plug, easy cold priming, immediate oil pressure, perfect lubrication winter and summer, on the ground or at high altitude—a maximum of safe flying hours.

A handsome, practical Pilot's Log Book sent free on request. Please use the coupon.

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TP Aero Rocker
Aero Lubricant

A year, paraffino-base, semi-cold-base, mineral-oil lubricant. Free flowing—will not carbonize. Send for
Lubricant Test Kit.



•TP-AERO MOTOR LUBRICATING OIL

Texas Pacific Coal and Oil Company, Fort Worth, Texas
Please send me, without obligation, your Pilot's Log Book.

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THE transfer of our personnel to new headquarters, on the seaboard, at Baltimore, is the first step in a program of wider service to the development of the art of aeronautics.

THE GLENN L. MARTIN CO.
Builders of Quality Aircraft since 1909
BALTIMORE
MARYLAND

THANK YOU for visiting AVIATION



The plane sketched is a Buhl Sport Airsailor, carrying pilot and two passengers. It is licensed for either the Wright Whirlwind J-5 or J-6 engine.

DISTRIBUTORS CALIFORNIA

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Clear Lake, Santa Barbara

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Major Flying Service
Norfolk, Virginia

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Johnson Flying Service
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MONTANA
MONTANA, ALBERTA, CANADA
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Vancouver, British Columbia

ONLY honest manufacture
endures.

For 90 years the Buhl name has been identified with progressive industry. That is one reason the Buhl Aircraft Company has assumed a position of acknowledged leadership in aviation. Its planes carry far more than the name alone—they preserve the priceless heritage of almost a cen-

tury of manufacturing integrity. Its sales and dealer policies are tempered by long experience and based on the sound business sense which assures profit.

We shall be pleased to mail you illustrated catalog of the complete line of Buhl Airsailors, or to forward details of our attractive dealer plan.

BUHL Aircraft Company

BALTIMORE, MARYLAND



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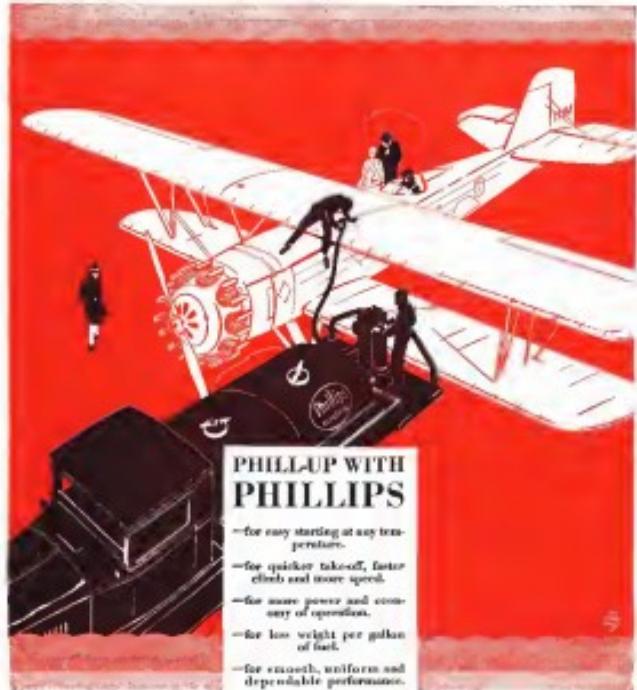
3 Points supporting *Pedrick* supremacy



- 1-MADE TO SPECIFICATIONS.** PEDRICK High-Shaped pistons always conform to the specifications of the engine designer. PEDRICKS are supplied and used by many leading engine builders. We will send upon request a reprint of an article from the Journal of the Society of Automotive Engineers entitled "Important Factors in Piston Ring Design." It explains why conventional piston rings are best.
- 2-EVERYWHERE AVAILABLE.** The PEDRICK distributing organization is world-wide in its scope. Everywhere adequate stocks of PEDRICKS are in the hands of reputable merchants ready to render service. Write now for the name of the nearest Distributor carrying a complete PEDRICK stock.
- 3-THE WELL KNOWN PEDRICK QUALITY** never varies. All PEDRICKS are High-Shaped—set to remain by heat. In this process every ring is made round from the start by machining a circular contour. In the last step of the process the finished casting is split and spread open the correct distance to give it the proper clearance. Held in this spread position it is set to that correct shape by heating it to 1200 degrees Fahrenheit. Because the setting is this shape under heat is the last operation of the process, the exact desired shape is always obtained. Furthermore, the shaping under 1200 degrees Fahrenheit removes all internal stresses which may have been set up by casting, cutting and machining—stresses which, if permitted to remain in the ring as in all other processes, would cause the ring to warp or to lose tension. But PEDRICKS can be made, even in the off-center type, their ordinary snap rings—25 each, and up.

Wilkening Manufacturing Co.
Philadelphia

THANK YOU for mentioning AVIATION



PHILLIPS WITH PHILLIPS

- for easy starting at any temperature.
- for quicker take-off, faster climb and more speed.
- for more power and economy of operation.
- for low weight per gallon of fuel.
- for smooth, uniform and dependable performance.

The problem of even distribution of vapors to all cylinders of an airplane engine has been solved. Disengaged-engine reckoning—That is—Miles—more Miles—don't happen when Phillips Aviation is used, for this super motor fuel vaporizes readily and completely under all conditions.

Phillips AVIATION

NATURAL GASOLINE FOR
CONTROLLED VOLATILITY
PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

Phillips Aviation gasoline is the fuel for "new production" high compression motors. Used by outstanding air transportation companies such as Boeing, Fisher, Western Air Express, National Park Airways. Available at a steadily increasing number of airports. Ask for it when in need of service.

THANK YOU for mentioning AVIATION

ANNOUNCING The PARKS PLANE

BUILT— for Superlative Performance

A lively interest grips the eager group that waits expectantly outside and from time to time at the Parks Airport. The maiden flight of a new ship is about to commence. It is a ship made to meet the mighty need of pilots who turn hopefully to each new plane hoping to find those things that experience has taught them to want. Will it fulfill their hopes.

"Here she comes!"

The hangar doors open to reveal the first Parks plane. It is the P. 1. biplane, powered with a Parni engine 0.53 meter—a trim and sturdy ship of pleasing plan. Trundled out onto the field, it seems to rest equably in a way that evokes no confidence. Every detail of construction—every line—strength—beauty—accuracy of design—all give promise of great performance. Its propeller turns easily, breathing like the strong chest muscles of a thoroughly fit man. It has that expansive wing span, its ample full fuselage, broad rounded nose, and slender, long landing gear. These are the characteristics that catch the approving eye of the "tunin' up" committee.

A beautiful plane—yes. But the proof is in the flying. Seated at the controls is a long experienced Parks' pilot, serene in the knowledge that this is a ship designed for the pilot just as he would like to have it. The blocks away, she turns proudly into position—deliberate and confident as the great "Sam-o'-War" going to the post.

"There she goes!"

"Roaring to a short take off. Toff up—she lifts—hangs in the prep—up—up—up. How that ship climbs." Clicked necks and straight eyes, which have seen new planes roll and career in the maelstrom of the sky. A sensation of longing. Then a slow, graceful roll—a spin around all with apparent ease. Thrashed down to a speed far too slow to keep the courage plain aloft, she flies steady, sure. Spins again—more rolls, loops, spins—prowess is fulfilled—surpassed.



HERE SHE COMES

A ship made to meet the mighty need of pilots who turn hopefully to each new plane hoping to find those things that experience has taught them to want. The Parks does because it is made to order ship embodying features contributed by pilots with 25,000 hours of flying experience.

Dealers: Perhaps your territory is still open

THANK YOU for visiting AVIATION

A New Line of Airplane

From a 2,000,000 dollar Corporation
Contributing 25 years of manufacturing experience

P-1 BIPLANE

P-2 BIPLANE

P-3 CABIN 4 PAS. MONOPLANE

P-4 CABIN 6 PAS. MONOPLANE

Built for
Superlative
Performance



CONCLUSIVE RESULT OF 25,000 HOURS OF FLYING

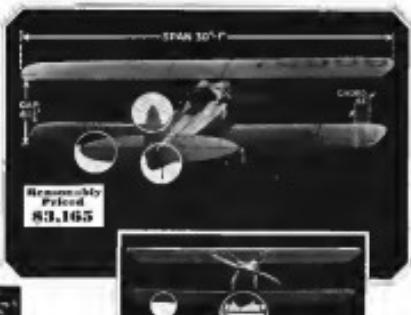
The Parks is a good landing ship—practically loads itself. A superlative performer, yet over-sensitive on the controls, yet highly maneuverable—spins already and comes out easily—rolls adroitly from level flight and actually gains altitude in a loop—and will remain silent at an unbelievable slow speed.

Construction Features

1. Dual wing shape areas
2. Wide range controllability of ship
3. Extra wide landing gear with spreader bar—seats direct—won't shear off, even if broken.
4. Wide range steering with wing wheel.

Performance Features

5. Short landing roll that won't end up under rough landings
6. Short take off
7. The Parks is a ship from a strength flying machine—comes out of a spin in the easily. Actually 360° in a loop.
8. Extra control flaps—make it stable.



PARKS AIRCRAFT, INC.
MO. THEATRE BLDG., ST. LOUIS, MO.

Write for information about our attractive offer

THANK YOU for visiting AVIATION

Specify

"Oxwelding under Procedure Control"

ONE of the most significant factors in the welding field is the attention being given to procedure specification in important welding operations. Uniform dependability of the joint oxwelded under Linde procedure control has made it the most popular joint where strength, tightness, and ductility in the completed weld are required.



**Process in
Procedure Control for Welding**

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The Linde Air Products Company

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Dissolved Acetylene

The Prest-O-Lite Company, Inc.

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Apparatus and Supplies

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BECAUSE Fairchild sold more dollars' worth of commercial air transportation units in 1928 than any other manufacturer, Fairchild is far in the lead in the application of modern production methods to the manufacture of airplanes.

Every Fairchild "T" performs like every other "T" because these ships are built to rigid specifications of design, materials, and construction. All parts are interchangeable, including wing and tail surfaces. At its price the Fairchild "T" represents the greatest value in a single-seated transport plane now being offered to the public.

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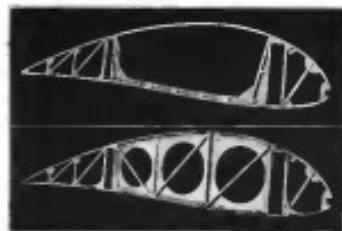
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THE FAIRCHILD "T" airplane makes necessary for safe
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ried fuel). Flying range: Under favorable conditions
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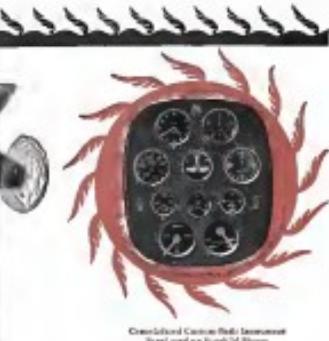
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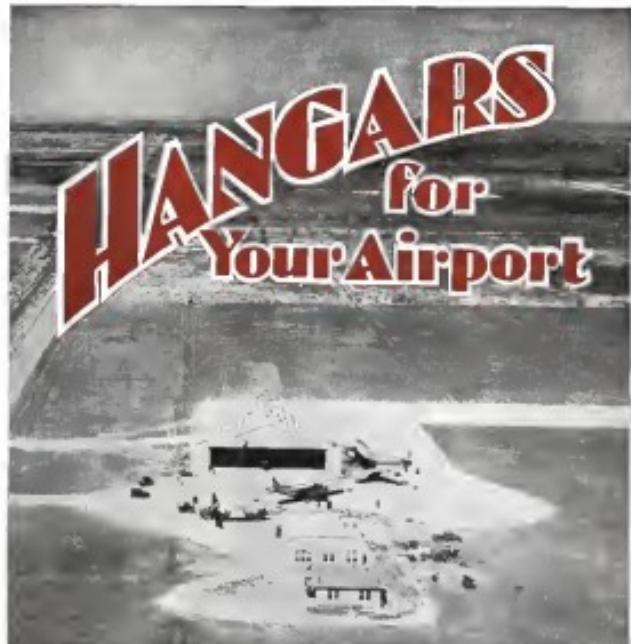
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Photo by Edna Smith from Service

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AVIATION
April 5, 1939

ENGINE PARTS



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one of the Ryan
aircraft is
tilted "off balance"
deliberately.



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Chairman of
Mahoney & Ryan
Aircraft Corp., J.
J. Mahoney,
and Charles A.
Anderson, Presi-
dent of the
new Ryan
Division of the
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There is Still Some Distributor and Dealer Territory Available. Write for Details.

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PERFORMANCE	
Cruising Speed	65 m.p.h.
High Speed	65 m.p.h.
Landing Speed	40 m.p.h.
Altitude	10,000 ft.
Climb angle	8° to 10°
Cruising Range	over 500 miles
DESIGN CHARACTERISTICS	
Wing Span	46 ft. 11 in.
Cross	0 ft.
Length overall	34 ft. 6 in.
Height overall	10 ft. 6 in.
Floor Plan	Two (2) by 14' 6 in. One (1) by 10' 6 in.
Interior	Soft leather seats, leather padding, steel frame interior, all parts, no wood or canvas.
Power Plant	Three (3) 150 H.P. Hispano Suiza, 90° V-12, water-cooled engines, 100 octane gasoline.
Propellers	Three (3) 5 ft. diameter, 10° pitch propellers, 100 octane gasoline.
Gear	1 ft. 6 in.
Passenger	4 persons
Carry Luggage	1 ft. 6 in.
Water Baggage	10 ft. 6 in.
Ground Weight Loaded	8,500 lbs.
\$15,500 Complete	
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SPECIFICATIONS

Power Plant Coarse, Mark III, 95 H.P. air-cooled, four-cylinder inline aircraft engine. Forme of assembly of operation and maintenance. Top overhead at 280 flying hours. Economy of Operation: 20 miles to gal. of gas... 500 miles to gal. of oil... Speed Maximum, 102 m.p.h.; cruising, 85 m.p.h.; landing, 35 m.p.h.; Ceiling: 12,000 feet... Cruising Range 5 hours or 320 miles... Weight: Light, 175 lbs... Aerobatic: 1150 lbs... Top, 1000 lbs... Dimensions: Wing span 38 ft.; width loaded, 9 ft. 6 in.; height overall 8 ft. 4 in.; length overall 24 ft. 6 in.; Price \$14,000, Flyaway or F.O.B., Bridgeport, Conn.



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The Hadley Page wing shows very
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The design of both pins and
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safe. The engine and control
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When the wings are folded the Whitsbury Avian
can be easily transported
and when the tail and
tailplane are folded the plane
is very compact.



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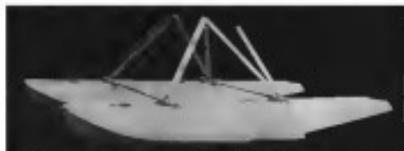
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And when to these qualities are added such practical factors as all-round serviceability, accessibility, low maintenance cost and moderate price, the Verville Air Coach stands out distinctively as a Worthy Descendant of an Illustrious Line.

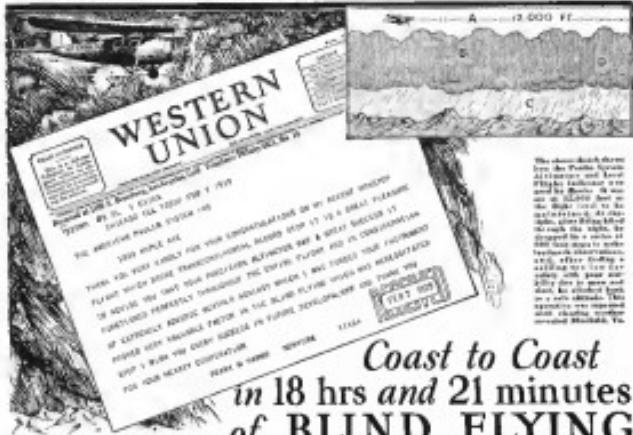
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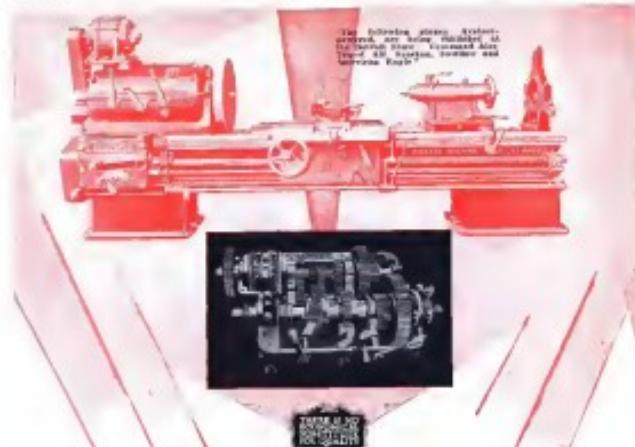
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The best long staple cotton is evenly spun into two-ply yarns which are highly mercerized to give strength and smoothness.

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The Fugle "Corsair" equipped with the new Vought amphibian gear.

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MICARTA propellers accompanied Commander Byrd to the South Pole. Bearing accidents, it is a certainty that these propellers will be in serviceable condition after their long arduous use amid snow, ice and storms.

Micarta propellers are made from layers of a specially woven fabric, impregnated with a synthetic bond and consolidated under high heat and heavy pressure into a homogeneous mass. The blades are then accurately

machined and provided with means for adjusting the pitch to suit flying requirements.

These propellers are light in weight and free from vibration and flutter.

Thousands of Micarta propellers have been made since the World War, when they were first introduced. They have been used on many famous planes and are serving daily in passenger and freight transportation.

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THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

April 6, 1929

Volume 11 Number 16

Used Planes and Trade-Ins

A RECENT report from English aeronautic circles informs us that a British concern is now taking steps toward the establishment of an aero financing outfit which will not only handle more permanent contracts on new planes, but used planes as well.

While, perhaps, it is too far too early in the game for American aircarrier manufacturers to take considerable time out and make an intensive study of the used plane market in this country, it would be very much worth their while if they gave that problem more than a passing thought. If production increases for 1929 prove to be as we have now correct there will be an awful lot of airplanes flying around one year from now. And a great many of the owners of those planes will give serious thought to trading them in for the next year's new model. Some will do the new models merely to be at the head of the parade, while others, such as aerial taxi operators, will seek the new improvements as a means of attracting more business. However, as in the automobile business, trade-in values will have to be quite attractive to enable a steady production of new products. But at the same time these values will have to be extremely low to permit a result without too great a loss, if there must be a loss.

Therefore, the main point to be determined is, what is the actual dollars and cents depreciation of a plane that has been used under normal conditions? At the outset we'd say that an airplane depreciates at a more rapid rate than does an automobile. On the other hand, the initial cost of an average priced plane, ready to fly, is more than twice the initial cost of an automobile. In short, with a higher initial cost and a more rapid value depreciation, because of a shorter useful life, there will have to be a loss on a trade-in, borne by either the manufacturer or the owner. (As far as goes on the distributor or dealer will take the loss instead of the manufacturer.) However, it stands to reason, that neither party is going to take the entire loss. So it behoves the aeronautical manufacturer to start considering the used plane and trade-in situation, with the idea and expectation that when the new arrives he will be able to advance a proposition that will be fair to all parties concerned.

London to India

THE opening of the passenger and mail service from England to India is an important but of minor importance. From the aeronautical side the carrying of a five thousand mile passenger line is no small matter, but the real significance lies in the effect that it will have on future relations between the mother country and its dependencies. The permanence of the British Empire is an historical phenomenon, for no other country has ever been able to hold together an empire so widely separated, and for so long a time. The achievement is the result of English character combined with modern transportation which has allowed engineers to go freely in the colonies but yet return to the mother country often enough to keep the old contacts and the old feelings of loyalty. As the colonies got more settled and firmly established, there was a tendency for the immigrants to remain in the colony and not to return to the old country. This has led to a growing differentiation of customs and ideas which obviously would have led to the disruption of the Empire.

In estimating the historical effect of the air link between the colonies, one must realize that the service to India is only a slight beginning of what some day will be a great system which will place all the colonies within a few days' travel of the mother country.



Spain to South America

SUCH has been the progress of aerostatics that a flight of more than four thousand miles nonstop has attracted only passing attention. To Spain, though, the fine flight of Captain Jimenez and Captain Iglesias has a deeper significance than it has to the rest of the world. The flight results to Spain the days when Spanish ships were masters of the sea. It reminds the days when all of South America was a Spanish province. It gives hope that the days of ancient glory will be repeated and that closer ties and more permanent ties will be established. In any case, it is a flight of which Spain or any other country may well be proud.

PROMOTING

Short Hop BUSINESS

IN SOUTHERN CALIFORNIA

A Standard Air Lines
Porthole "Short Hop" to
Shore over Los Angeles



By CHARLES F. McREYNOLDS

WHEN the 1929 flying season at hand there is considerable optimism in some quarters as to the volume of "joy-ride" traffic that certain operators may expect this year. The great decrease in such traffic during the last few months of 1929 has been noted by most operators as an indication that the flying public is "fed up" on short pleasure flights and that the flying of the future is to be done principally over established airways when time dictates that the passenger employ the fastest available transportation.

Although we may always expect a seasonal decline in pleasure flying with the approach of winter weather, the present fall probably points beyond a normal reaction to the weather and seems to indicate that the public is through with flying just for the novelty of getting off the ground. Thrilling flights of all sorts have kept popular "stunt" at a fever heat for the last two years with the result that thousands of people have taken short flights for no good reason at all except a natural curiosity to find out what it was all about. The airplane has now become so commonplace, however, that this sort of passenger traffic should be expected to decrease. No one pays good money three days in cliché in an auto mobile and risks around the block just for the fun of it. But there are millions of people who every day are mobile, rested state, or established bus lines because they want to go somewhere or see something. The secret is to be the plane upon which the operation of aircraft is exciting. For every passenger who a year ago took an airplane ride for the thrill of "being here up,"

there are probably at least 10 who this year will ride for reasons of same pleasure, scenic enjoyment, social desirability, or business necessity.

Of course we will have "first timers" as long as there are 2,000,000 new Americans born every year, but most of these youngsters will probably be getting their first ride in connection with school parties of Sunday School classes, or some equally generic introduction.

The point is that the operation of aircraft is no longer a romantic adventure and the small operators of the future must adopt the most modern and constructive methods of doing business. If aviation is to enjoy a continued growth and prosperity it seems imperative that all aircraft operators should recognize this situation and make every effort to face the 1930 flying season with a well thought out program for standardizing and serving every legitimate source of traffic. In the past almost every owner of flying has taken his first ride in a small openplane and thereafter has become a prospective flying student, aircraft purchaser, or transport airline partner. There is every reason to believe that intensive promotion of pleasure and scenic flights will bring benefits without end profits to the small operators and will make possible the continued rapid growth of the entire industry.

There are a great many established aircraft operators in Southern California and the resultant competition has brought rapid development of traffic promotion methods. While these methods are not necessarily superior to those employed elsewhere it is hoped that an analysis of them will prove valuable to non-plane operators generally.

One of the most commendable features of operations conducted in this territory is that the operators have formed a co-operative organization known as the California Aircraft Operator's Association, and through this medium they unite to advertise aviation and encourage flying generally. Farther than this they main-



The American "Mitsubishi" eight-passenger cabin monoplane operated by Eddie Avera Enterprises, Long Beach, for charter work

tain a central office through which all business is cleared so that a charter customer, for instance, who finds a particular operator unable to serve him for some reason or other, is referred to the central office and from that point is placed in touch with a member operator who can give the service required.

Another factor in the success of the California Aircraft Operator's Association is that each member has sought to specialize in a type of traffic not handled by any other operator. This method gives each operator a legitimate place of traffic promotion without encroaching too severely on some neighboring operator. For instance one operator will concentrate on traffic from commercial organizations, another with only Eastern tourists, another goes out after women's club and social organizations, a fourth specializes on flights for school children and high school flying club members. The result has been a greater total volume of business and a certain degree of prosperity for all of the associated operators. Within the Association regular meetings are held and problems are placed before all the members for solution. This has brought better publicity, closer co-operation with the city, state and national officials who may have key connection with the operation of airports; better methods of marketing field traffic, and many other real and valuable improvements to mutual benefit.

Of particular significance is the fact that several starts are being made to attract crowds to air meetings, have been almost entirely abandoned in Southern California. The most popular flying fields and the areas in this district that are doing the greatest volume of business are those who were the first to ban pancake jumping and violent starting over their fields. While these exhibitions undoubtedly have a place in connection

with specially arranged programs, not intended to boost passenger flights, they should certainly be abandoned as a method of traffic promotion. No other form of transportation depends for its traffic as a scheme for attracting large crowds to the mass terminals, the plan universally employed being that of giving direct to the group who should be interested in traveling by air transportation. This is the technique now being used by airline operators of this territory. Each operator analyzes his available sources of traffic and then finds some method of appealing directly to these sources.

It is, of course, not always possible to accurately predict either the type or the volume of traffic which a given operator may anticipate. It should be possible, however, for any operator to investigate all of the sources of traffic in his locality, engag himself for the particular class of passengers which seems to promise the greatest volume of traffic, organize his flying service to particularly appeal to this class, and then develop specialized methods of advertising which will catch the desired group, or groups, with the least possible waste. Particularly should it be possible for an operator with one or two seasons of flying experience behind him to review the type of passengers who have bought the greatest volume of tickets, and in the future to concentrate on the phase of flying which will further encourage this profitable traffic.

Southern California is particularly fortunate in having a greater many different sources of short-hop traffic. First of these are the thousands of tourists who periodically visit the West. Then the great oil boom in the southern part of the state has brought a flood of traffic from persons who are interested in the oil well situations and wish to fly over the territory for a comparative view of those sections under development. Still another protection class of traffic has been from the many small operators and prospectors who have thousands of whom have been engaged in oil and mineral estate developments. These groups are not representative of what other operators throughout the country should expect in the way of traffic, but they do serve to illustrate that each particular section may have sources of traffic peculiar to that locality, and which the aircraft operator can cultivate with profit.

While week-end and holiday pleasure seekers will probably always assure a reasonable business for one or two days of the week, it is the consistent volume of traffic maintained throughout the seven-day period that



Passengers on one of Western Motor Tours' round-trip aircraft and air route trips about to embark on a plane at Cleme Field, Santa Monica

gives the operator his profit and it is here that giving analysis is of the greatest help. Women's clubs and societies, sales organizations, chamber of commerce groups, gymnasium clubs, student groups and student aviation clubs, groups of factory employees, tourists, and many other classes of people may be induced to fly during work days, and in very considerable numbers.

Dycar's Airport, for instance, has developed a steady volume of passengers from among men's and women's gymnasium classes, and from ladies' societies of various sorts. Although this airport is located several miles farther from downtown Los Angeles than a number of other representatives of the field, it has done well in the passenger business. It is a simple arrangement for a group flight on a given date and if necessary arrangements for the transportation, thus assuring that those people will drive the extra miles to the airport which had the enterprise in seek of its patronage.

Another significant example of group analysis is reported by P. M. Goddard, of the Palo Alto School of Aviation. When dealer located on the campus of the Stanford University in the central part of the state Mr. Goddard saw no reason why possible flights should not appeal to young college students and arranged for such a service at slightly higher rates. He reports that the success of this innovation has been nothing short of remarkable and these rates are good again.



Two biplane operators in formation over the American Airlines Experimental field at Santa Monica, Calif., flighted side by side to prove the safety of their work-and-Sports operators presented there.

why college students everywhere should not be offered such an aid to romance.

A special flight for while families has proved a happy thought for the Culver City Airport, west of Los Angeles. This field is located in a quiet neighborhood but one characterized by a great many wealthy families. By encouraging entire families to take scenic trips together, a steady and profitable source of traffic has been developed. Both American planes provide the necessary cabin which especially appeal to this class and the novelty of the service has proved almost self advertising, each family tending to tell its neighbor on the ride.

Another service which offers the greatest possibilities to two-plane operators everywhere has been developed by the Tanager Motor Laundry Co. In this case an

analysis of tourist traffic led the Tanager Motor Laundry to add as Air Laundry service to the parlor car and laundry service which has been provided Eastern tourists for a number of years. The Tanager Motor Laundry operates 20 double parlor cars over eight regular routes, and 200 laundries with chauffeurs who drive those customers who seek a more exclusive mode of transport. Two of the air routes include Clovis Field, Santa Monica, as their terminal. The Air Laundry therefore was established at Clovis Field with two Boeing twin-engine planes as the standard aircraft. One less than a dozen planes were ordered initially. The traffic has been sufficient to warrant doubling the number of cabin planes used, within the first six months of operation. Several bases are operated over the two lines which serve Clovis Field. These arrive at intervals of 15 or 20 min. and thus permit a steady volume of air traffic throughout the afternoon, and on every day of the week. Those passengers who do not take the flight are shown about the field by a guide. Passengers on other divisions of the Tanager Motor Tours are told about the corporation bus and are told and many are thus induced to take advantage of it. One-tenth of the 200 laundries are also given a concession for all passengers that they bring to the field and much traffic has resulted from that source.

The logical development of the above service would seem to be for every operator who can, to make arrangements with nightlong bus companies to bring their passengers to the field for a scenic air tour, a fair compensation being paid to the bus operator. Laundries and taxicab operators could also be induced to bring passengers to the airport if they received a commission on all passengers so obtained.

Some local operators are finding hunting and fishing clubs members a good source of traffic in seasons. It is not necessary to provide an elaborate cabin service for this service as the average number of traffic demands but the operator must be able to get in and out of small fields or high mountains in connection with the numerous resorts to which the club members desire to go. The El Dorado Aero Corp., Las Vegas, is located near a very considerable colony of retired business men who live at the beach for purposes of health and recreation and are willing to pay a premium for road transportation to the vacation resorts. This traffic has been greatly increased by the El Dorado Co., through the purchase of an American Albatross eight place cabin monoplane. It is not particularly difficult to arrange for good landing fields close to mountainous resorts in most parts of the country, and this class of traffic will probably experience a most satisfactory growth in the near future.

It is not always possible for an operator to get the inside track on business and civic groups, but if a good approach can be arranged it is almost sure to be profitable. The American Aircraft Corporation of Los Angeles is particularly fortunate in this respect in that the president of the company, Theodore T. Hall, is also vice-president of one of the leading downtown banks and is, in addition, a prominent attorney. Through his many associates he has been able to entice flying business bureaus and various business groups. This type of traffic usually results in much valuable publicity also.

A very profitable source of business has been developed by the Aero Corporation of California directly

as a result of analysing the passenger field. This company found that on one species was spending a fortune for student groups, and therefore deserved considerable attention to the development of youth markets. Representatives of the company were sent to all the schools of the city to assist in forming high school aviation clubs and the students were invited to the flying field and shown through the shops and hangars on special days. On these days student fares were in regular use and the result proved to be an enormous volume of traffic from this source. The lower prices were compensated for by the fact that the passengers were so small that there could naturally be earned in a two passenger open plane when we have taken places of the most luxurious sort now available.

Fleet equipment and the air trip itself should also be given considerable thought. Some fields may prosper without spending much money on landscaping, passenger waiting rooms, and other field improvements, but in locating the field where an air station is given to the selection and maintenance of the flying equipment, will prove the most popular. Still again, it may be that some operators can profitably continue operations for an indefinite period without offering anything more than a "ride" as an attraction, but in this event part it in the operators who develop and expand the route to particularly attractive portions of the landscape, who will enjoy the most profitable trade. Circle cities, beach trips, flights over nearby mountains, deserts, or lakes, all should be laid out on maps of the field, the price of a definite flying time and price per passenger, and then be advertised to prospective passengers.

An excellent example of how it is possible to build a truly and profitably traffic clearly by so combining both equipment and flying service, is found in the history of the American Aircraft Corporation. This company leased a good field by complete grading, a heavy sowing of grass, and provision of an underground sprinkling system, thus insuring a completely dust free runway. Attractive individual hangars, a flies kiosk, restaurant, public rest rooms, ticket office and administration building were all painted white with blue trimmings. The entrance from the main highway is well defined and leveling in any weather, while whitewashed stone borders and decorative flower complete a picture which has proved attractive.

This public interest is capitalized at American Airport in the form of the most complete personal service to tourists. Entertainment is provided spectators by a landscaper system which broadcasts radio music along a half mile front. Photo and field attendants are picked for their ability to please the public, in addition to the ordinary requirements and each attendant is treated as though he were being conducted as a personally decorated train. Assistance in finding in dress, helmets and goggles, and passengers are helped in and out of the planes by attendants. During the flight every attempt is made to give a smooth ride without jolts, noise or lulls, and the pilot consciously handles the engine while he explains points of interest in the scenery. Another service which is proving extremely popular is the practice of having planes in formation, two or more taking off and flying together.

The American Aircraft Corporation has arranged many special trips and caused the pilots to fly certain routes over beaches, mountains, Hollywood moving picture studios, various fields, and other points of interest. Night flights and moonlight rides are also regularly conducted with excellent results. The result of this complete personal service to the passengers has been a constant repeat sale business and the development of a cluster of customers who make regular use of the profitable charter service.

The Harry C. Smith Aerodrome, adjoining American Field on the south is also a good example of a field where the public is attracted because of special attention to the architecture of the field buildings, which in this case are of unique colonial structure. Lincoln Air Lines, north of the Sport Field, has installed a large



and will keep lanes between the takeoff apron and the spectator area, thus increasing the spectator interest by eliminating dust and making the field pleasant to look upon.

Excellent use of the radio broadcast loudspeaker system is made by Baker's Airport, adjoining American Field on the south. Here the loudspeakers are strung out so far apart that half a mile and a field attendant gives regular radio bulletins over them between programs of radio music. This employment of loudspeakers seems to have many merits, for it helps to drown the noise of the planes, makes it possible to page up employee, pilot, or customer who may be at some distance from the administration building, keeps the crowd amused, and gives the operator a chance to talk directly out at some length.



A dinner party about to leave the field of American Aircraft Corporation to a mounted auto procession.

With an audience of several hundred people who are as receptive mood. It will probably prove a profitable investment for almost any operator to install such a system.

These planes should be kept clean and should be displayed only on the field as almost an icon of aviation operation. An advertising model recently developed by the Aero Corporation of California has made it possible to display an entire airplane and all its parts back on the ground. Every plane operated by this company is so washed at regular intervals, and the resultant impression upon the general public is that the planes are all brand new and in the most perfect condition, which in fact they are, but it would be no apparent if they were covered with grease and mud.

Other companies who have made a wide appeal by preparing a number of optional service lines include the California Aerial Transport Co., and the Mutual Aircraft Corporation. The former company has arranged a 100 mi. circle tour of the Los Angeles area and by concentrating on this one trip has been able to build up a very good volume of traffic. Of course there are other trips offered, as well.

The Mutual Aircraft Corporation, through an operation of a night express route between Los Angeles and San Francisco, has gained much valuable information on night flying and has ample night flying equipment available. Short night flights have therefore been inaugurated by this company with very considerable success. It is interesting to observe here that whereas a year ago there was not a regular night service offered anywhere on the coast, now there are two, and in fact every operator will do night flying if requested. With better field lighting equipment and the increased use of lights on planes, this class of planes flying may well become the leading system of business.

Although such large operators as the Western Air Express and Maddox Air Lines are not directly con-

cerned to the average airport conducting a pig hop and charter service, nevertheless these two companies have developed a type of service which many smaller operators might well copy. Western Air Express arranges far round trips between Los Angeles and San Francisco, with one way by air and the other by ocean steamer; while Maddox Air Lines provides such a service except that the return trip is made over a seaplane base line. In either case the round trip fare is lower than the corresponding two car-way fares. There seems to be a field here for the development of short airplane flights to resorts at lakes, rivers, mountains or ocean, the passenger flying out and returning as he leisure by means of surface transportation. Although such service enters the status of regular transport operation, still it can hardly be claimed with the larger companies operating big planes over long distances, and will probably become a regular phase of two-phase operations in the future. Certainly it would be to the advantage of the aircraft operator if such a service might be advertised and arranged for through the ticket agencies of railroads, bus lines, water lines, and electric car systems. It is apparent that future development of non-passenger traffic will depend largely upon better personnel service, more complete planning of routes and schedules, and a very high degree of field organization and equipment selection.

Having organized for a selected type of traffic there remains the problem of how best to advertise the services offered. Probably every operator in the Southern California area now advertises flights from a scenic, social, educational, or business viewpoint. Thrill or



An aerial road map for planes, which was drawn by Walter Hamilton, vice-president of Aero Corporation of California.

novelties are not even considered. Prospects are told on the desirability of viewing vineyards, orchards, harbors, oil fields, industrial districts, etc., from the air. Constant emphasis is placed on the fact that no airplane can go further in less time than any other form of sight-seeing vehicle, and that the visibility in all directions is multiplied as though one were on a very high mountain peak. Last, but by no means least, a comparison is made between the dusty, dirty, heated motor bus or car, with its insupportable traffic delays and dangers, and the airplane riding smoothly and comfortably through the clear blue sky above a scene drenched in changing pastel colors.

In getting this message over to the public it is necessary to adapt the type of advertising to the group which is being particularly appealed to. A field located on a leading boulevard can afford enormous loudspeaker systems, large and attractive advertising signs on the property, illustrated folders for distribution among visitors,

and a direct welcome to mingle with the visitors and sell their tickets while they are in a buying mood. On the other hand a more isolated field may resort to direct and advertising to select groups, advertising over the radio, in the newspapers, at neighborhood theaters, or indirect advertising passed through the services of a publicity man or by showing favors to newspaper men in return for names. It is generally known that the operator enjoys the greatest volume of patronage.

Of course no form of advertising diminishes the necessity of personal contact. The field ticket sale, and in most cases the final decision to fly or not, will be the result of direct personal selling. For this reason it is necessary for the operator to present his representations to community theater managers, golf clubs, hardware chain, student organizations, and in some cases conduct a street lecture to house crews of people where he happens to lecture should be customers of his.

The Aero Corporation of California has done much of the direct personal contact with through Fred Blattner, advertising manager, as well as other members of the company who give after dinner talks and widespread opportunity to speak to any group on the subject of aviation. Mr. Blattner has devoted much time to visiting student red clubs, belonging to various cities, and arranging special events or flights for them, and has found this one of the most valuable forms of direct advertising.

With regard to the placing of traffic solicitors out on the line of operation, this practice is now followed by almost all operators in this territory. Records of the Aero Corp. show that after placing good solicitors on the line a little more than a year ago, business increased more than 700 per cent within four months. Much the same results are reported by Ingles Airport, Don Cardell, Waco dealer at Bakersfield, and several other leading operators. It is essential that these men who come in contact with the spectators should be tactful and affable and should rather attempt to sell the prospect on aviation in general than to high pressure him into flight against his will.

An excellent form of indirect advertising is employed by the Battle Mountain Airport, State Army. Once a week a radio broadcast is held at this field, which is attended by aviation enthusiasts from all over the state. At the same time civic leaders from surrounding towns fly to the function and much favorable publicity is thus created. Then at regular intervals during the year this field stages special flights for chararters of commerce from the surrounding towns. The flight is given at greatly reduced rates and brings no direct profit, but the resulting publicity through the newspapers, and the prestige attaching to flying leading business men, has proved an excellent way of increasing traffic.

Since much of the American Aircraft Corporation's

We show and feature our
Division of Broadcast and
Directed Air Lines



business comes as a result of repeat sales, this company goes to great lengths to provide every passenger with further information about the field and the services offered. Several well illustrated folders have been prepared and are given to each passenger. In addition there are attractive signs on the sides of the hangars telling of other airline flights. This is the writing room there are many photos of American Aircraft planes and planes, both on the ground and in the air, and aerial views are displayed of points of interest seen by passengers on the various service tours. This effort appeal to visitors is competitive, cheap advertising and brings in a steady flow of profitable repeat passengers.

Sometimes a free blanket station can be arranged at very little expense. For instance the Aero Corporation of California has on several occasions occupied sections of downtown Los Angeles theaters with complete automation for wear during the showing of an air picture. In return the theater owners sign on the foyer telling the public the name of the aviation company supplying the equipment, and of even greater value has been the fact that the covers worn by the users carry in large letters the name of the flying company supplying them.

Still another form of feasible advertising used with success by the Aero Corporation has been the placing of an Aero Corp. sign about once a month at certain neighborhood theaters. Ten free tickets for air rides may be given in return for permission to show a film depicting activities at the field. Not only does the public have away patrons but each free ticket usually brings a pay passenger along.

Direct newspaper advertising has been used with good results by the Aviation Aircraft Corporation, the Associated Aircraft Corp., Aransas Eagle Distributors, and some others. Where this newspaper advertising is employed it is essential that some particular service be stressed and the ad sense most productive when placed on either the travel page or the sport page of the paper.

In general it is probably necessary to advertise aviation more than any other service or commodity offered the public. This is in spite of the great amount of unprinted publicity which the industry has received. The answer is that the advertising paid for is used to buying transportation and advertising media, and it is finally averred that greater reliance to do business these seem to be areas of advertising which can equal direct personal contact.

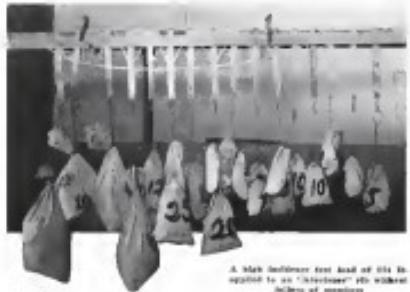
The above methods of traffic solicitation represent some of the best efforts of an air line which is now enjoying a greater per capita air travel than any other section of the world. Nevertheless, it is certain that in increasing traffic sources, organizing to serve special types of traffic, and advertising the services offered, the airline operator can learn much from long established transportation companies who have faced their problems in the past. Methods in the aircraft operating industry are still very sketchy and the operator who can best apply to air travel the lesson which have been learned on the ground will undoubtedly have ahead.

THE "AEROTRUSS" BRAZED

"U" Channel

SECTION STEEL RIB

Largest Company of Los Angeles plans immediate production of new type of member to meet the requirements of individual manufacturers



A. Metal bending test load of 614 lb applied to an "Aerotruss" rib without failure of material.

SUCH promise has been shown by the "Aerotruss" braised "U" channel section steel rib recently developed by the Largest Company, a subsidiary of the Eason Steel Co., of Los Angeles, that place has been had for the immediate production of this type rib in large quantities. Engineers of the Largest Company are said to be in touch with some two to three large aircraft firms throughout the world with a view to supplying ribs developed to meet the specific requirements of each individual aircraft builder. If this can be accomplished it is believed that material economies will be effected in undertaking large scale production of certain structural units within a single factory, much as such methods have been found practical in certain phases of the automotive industry, where some hidden spandrel stiffeners, others on bodies, frames, axles, etc.

The channel construction, as seen in industry, has advantages for other aircraft structures than ribs, and is being developed for spars, bulkheads, internal struts, compression members, and various places within the structure of the airplane. If these developments prove successful it may result in popularizing the "U" channel steel joint construction throughout the aircraft industry. Certainly steel has many advantages for use in the modern airplane, and since the U channel is a particularly simple type of section to fabricate, weatherproof, inspect, or repair, it will indeed be a happy circumstance if that structure may be proved completely practical for aircraft construction.

Although many attempts have been made in the past to apply the U channel to ribs and spar structures, the chief difficulty has been that melting weakened the joints and welding was impractical because of the thin gauge metals used. The concern claimed for the Largest structure is said to be entirely the result of a new method of low temperature heating, the heat being supplied by an automatic furnace which applies the heat uniformly over the entire surface. The maximum heating temperature is 1,100 degrees F., it having been found that this process has a negligible effect upon the strength of the metal, even where the gauges are as low as 0.010 in. A special formula furnace was used for this heating process in order that the bronze may melt at exactly the right temperature of the heating tools and the metals being joined. By a dipping process this is just sufficient heat applied upon the bronze base to insure a perfect braze. Although the heat applied is comparatively low and is moderately applied by a rotary torch, it has been found sufficient to insure the heating metal completely over the joint and insure a perfect bond between the metals over their entire adjacent surfaces. The latter result is particularly advantageous because it distributes joint stresses over a much greater area of metal than is possible by riveting or by welding, where stresses are necessarily somewhat localized.

In the ordinary Largest steel truss ribs, U channel cap strips of SAE specification 1010 cold rolled steel are rolled to an approximate curve by means of a specially developed triple roller. The cap strips on the 5 ft. Claris-

AVIATION
April 6, 1938

An "American" using vibration equipment to a rate of 1,000 vibrations per min., with a deflection of 1/16 in.

Y ribs are of 0.015 in. gauge and the webs of 0.010 in. gauge, both channels being 3/16 by 2 1/2 in. in diameter. The web strip is stamped, cutted, and folded by machine, and is a single piece of channel in front of, between, and in rear of the two spars. Separate danger members are stamped in form the spar operating in the ribs. These members being manufactured in several different types for attachment of the rib to wood or metal spars. The rib is assembled in a steel jig of accurate dimensions and so constructed that two men can manipulate the entire jig beneath the rotary braising machine and quickly braze every joint on one side. The rib is then removed from the jig and the opposite side is braised. Tests have shown that two men can braze a 5 ft. Clark-Y rib in 4 minutes and 10 sec.

Since the success of this method of construction depends entirely upon the braised joint, numerous tests have been made to determine the permanency and strength of these joints. In one test on a joint between a 0.015 and a 0.010 gauge, 2 1/16 by 3/16 in. U channel, the thinner metal pulled apart at a stress of 462 lb ap-

pearing for each vibration. This was accomplished by means of a double eccentric on the shaft of an electric motor placed midway between the two spars, rib being inverted and the vibration applied to the lower cap strip by means of a hooked end plus clamped to the strip and against which the eccentric operated. After a run of 48 hr. and 20 min continuous vibration the rib was naturally examined and no evidence could be found of fatigue in the joints or metal, or of any damage of any sort in the rib. The rib was then placed in a static test stand and submitted to loads totaling 440 lb applied according to the Navy high confidence loading conditions. Maximum deflection at a point midway between the spars was 2/16 in. as no failure resulted in the structure. The weight of this rib was 7.74 lb and the weight-strength ratio was shown to be in excess of 59.1, which is said to be considerably higher than the average weight of similar dimensions.

A further static load test was made on a 4 ft. Clark-Y rib weighing 7.06 lb. In this test, load was increased to destruction, according to the Navy high confidence loading, the second diagonal member in rear of the front spar failing in compression at a column load of 478 lb., and a maximum deflection of 3/16 in. midway between the spars. In this failure, after the initial load of 478 lb. it was found that the structure would still support a load of 200 lb., demonstrating the extreme strength of this type rib. Strength-weight ratio for this rib was 67.7, which is exceptionally high.

The Largest rib weighs approximately the same as standard wood ribs of the same size. Its cost is said to be an added feature.

Much experimental engineering is now being conducted in an attempt to apply this new rib structure to spars, bulkheads, etc., in order that these units may be standardized and manufactured in quantity. Several particularly promising developments have been made with the rib itself in making it applicable to wing structures of wood or metal, and cover material of cloth, wood, or metal.

In the normal ribs as first developed, the cap strips are simple "U" channels with the open sides facing in and web strips bowed into the upper "U". Attachment to wooden spars was first provided for by affixing with the "U" channels which framed the spar opening, and then nailing through the wood and metal in the spars. A more practical method seems to be for a flanged "U" channel spar hole framing which permits nailing the flange

The "U" channel of the rib before and after bending and after being bent to destruction between cap strips.

approximately 80,000 lb per sq in., but the brand joint was not damaged. Numerous tests have proved that it is impossible to move the joint itself, even by means heat, unless the heat is applied uniformly around the entire joint so as to melt all of the brass metal. A vibration test of the most drastic character had no effect at all upon the strength of any joint in the rib and it seems hardly likely that a wing rib could ever fail from this cause. In this test a Clark-Y rib of 5 ft. chord was loosely towed toward two false spars and subjected to a vibration rate of 2,000 per min. with a deflection of 1/16

directly to the spar by means of lugs punched in the flange during manufacture. The leading edge is situated in a similar manner in a flanged U channel by passing through the flange, or in the case of a metal leading edge, by riveting. Trailing edge construction permits use of steel cable, steel tube, or V metal strip without altering the rib. Two steel tabs are provided to project slightly at the rear of the rib and these may be readily bent around the tube or cable to hold it permanently in place. A V strip is also manufactured by the Largent Company for use on the trailing edge, and is applied by driving the tabs on the rib through slots punched in the V strip during manufacture. When these tabs are bent around the V strip they have proved of more than ample strength.

For plywood-covered wings a rib has been developed in which the "U" channel cap strip is inverted, the web members straddling the "U" channel at each end.

The covered U is filled with wood which is fastened in by pins through wood and metal, and the plywood is nailed directly to the wood filling.

Another development is an inverted and flanged "U" channel cap strip so constructed that it rests upon wood or metal covering, may be attached to the rib. For plywood-covered the channel is filled with wood and the plywood nailed directly to it as described above. For metal covering the material is riveted directly to the channel flanges. For cloth an ingenious arrangement has been worked out which may prove of value in reducing the cost of covering wings. Instead of passing needle and twine completely around the rib and upper and lower cloth covering, this rib attaches the cloth directly to the cap strip, flanges, upper and lower surfaces being independently attached. The flanges on each side of the "U" channel cap strip is stamped with depressions every two in from nose to trailing edge. Nipple holes are stamped at each side of these depressions in the flange in such a way that a needle may be passed along the flange, through the flange holes, and alternately above and below the flange. Depressions are staggered on opposite sides of the channel in order to distribute the points of attachment more evenly. In fastening the cloth cover to the cap strip a reinforcing strip is first placed along the dots above the rib. Then the attachment is made by passing the needle along through the flange depressions, for passing the strip along the depressions in order that the needles will catch the cover to the rib. The cover strip is thus passed in the necessary manner when the wing is joined. Instead of needle and wire it is thought that a metal wire might be used for this stitching. While this method of fastening seems to hold promise of economy in manufacture and repair, it will probably need considerable flight testing first in order to develop this system to the point where it may be considered practical for use generally.

Excellent compression type bases have been developed by bracing four flanged U channels to an ordinary rib, balances the spars. One channel is braced on each side of

the web members, top and bottom of the rib, the resultant rib being exceedingly strong and yet light and comparatively simple to manufacture.

Manufacturing methods for developed census of special triple ranking machines now permit the U channel with the approximate weight savings desired, special stamping, machine for stamping, bending, and crimping the web members, light and accurate snap pins which permit rapid assembly of the rib parts, welding between the automatic riveting machine, and quick removal of the rib for completion of the leading process, and perhaps most important of all, the rotary braising machine which makes it possible for the present plant to turn out 600 lbs per day if necessary. This braising machine is a development of the lead barreling tools, it is said, and assures that just the right temperature will be produced for a perfect joint. The torch is mounted so that it ranges

continuously, the horse's brain was also rotat- ing, and is such a manner that the neck and was come together, at the spot to be joined, long enough to melt the bones, and yet does a perfect joint. Of the utmost impor- tance to the success of the metal rib is the process of electrode plating which is applied after comple- tion of all braising. This is the standard "Cobalt" process used throughout the industrial world. It

produces a protective coating said to be three times as effective in resisting corrosion as any other plating or painting system that has yet been devised for the protection of steel. The resulting plate is about 0.0001 in. thick, costs approximately five cents per sq in., and is said to make the rib immune to the effect of salt air or sea water exposure for all practical purposes.

Patents have been applied for on all original phases of the new development and engineers of the Elco Steel company are co-operating with the Largent Company in working to give the new structure a practical application to every possible phase of modern aircraft construction. In addition to the "U" channel structure development the Elco Steel company is said to be interested in the development of a new type aircraft Diesel engine, working models of which have been constructed, and also in the development of large seaplanes flying boats for use on the Pacific Coast. E. M. Shultz, president of the Elco Steel Co., is a director in several western railroad companies, holding a number of small oil wells, and several other interests. The Elco Steel Co. is considered one of the largest industrial organizations on the Pacific Coast and has ample funds to conduct any reasonable operation in the manufacture of aircraft or engines.

The Largent Company is operated as an entirely independent subsidiary of the Elco company, in an effort to develop new structural methods which may prove of value to other Elco units, and to the aviation industry at large. Officers of the Largent Company are: E. W. Largent, factory manager and chief engineer; W. E. Merchant, general manager; and Wilson J. Waterhouse, consulting engineer.



Top—Rib after test in heat test without failure or serious deformation. Bottom—The experimental Ba air heating

THE USE OF Radio

IN SAFE FLYING

By F. C. HINSBURG

Chief Engineer, Airway Division,
U. S. Department of Commerce



F. C. Hinsburg

improved instruments aboard airplanes, making it possible to fly safely with negligible regard to weather conditions and visibility.

Modern airplanes are being designed for cruising speeds in excess of 125 m.p.h., having load factors which make them aerotely under weather conditions encountered more than 99 per cent of the time. Flying under the condition of poor visibility is a problem that now confronts the air transportation industry and one which radio will be called upon to solve.

The Weather Bureau is making preparation for establishing a system of gathering the weather from secondary sets for the more frequent preparation of weather maps from which to forecast weather. The Airways Division has established air navigation facilities between Cleveland and New York, by which reports of weather and landing conditions are gathered along the route each hour and broadcast from radio stations. Radio direction is being provided to guide airplanes over a safe route from the point of departure to destination. In the future, a radio altimeter and artificial horizon mounted on the airplane as destined to make flying safer

AIR TRANSPORTATION has established itself in our complex system of civilization in competition with other forms of transportation and, at the present time, there are 52 air transport companies flying on regular schedules, aggregating 30,000 m. per day in the United States. Twenty-nine of these companies carry and over the lighted airways and about 15,000 m. of flying takes place each night. The air navigation facilities established by the Department of Commerce on the lighted airways consist of instrument landing fields spaced 30 mi. apart with intervening beacons at 10 mi. spacing. A flying efficiency of approximately 90 per cent is possible under this system of aids to navigation.

A double schedule was started on the Transcontinental Airway on the first day of this month, and continued at the close of the month due to the Pacific coast is delayed 30 hr. later on the Atlantic seaboard. The road being to transit time rights and one day. Plans under way provide for the operation of large passenger airplanes over practically all routes. The success of these services will depend very largely upon safety, regality of flying and percentage of completed trips on scheduled time. That can be assured only by the use of radio, a more comprehensive weather service and

far better radio range teams at Valley Field, N. Y., shorter sets and even mounts for low altitude.



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under condition of poor visibility when instrument flying takes place. Landing blindly by instruments in thick weather will require the use of radio facilities and landing directions from airports must necessarily be given by radiotelephones.

There are several systems utilizing radio suitable for guiding aircraft in flight under conditions of poor visibility. The directional radio beacon appears most suitable for a system of airway routes and three radio range beacons of that type are now operating on the Cleveland-New York Airway. These beacons are established at Bradley Field, Beloit and Cleveland and transmit signals on frequencies in the 285-315-kc band. The antenna system is supported by a vertical pole and in the equivalent of two loops spaced 120 deg apart. The pattern of the signal for each loop is the figure eight, and since the loops intersect at 120 deg, the patterns overlap. The transmitter sends out a signal on each loop in sequence and in such a manner that the overlapping pattern interlocks, creating a prolonged dash at the points of equal signal strength by combining the two signals. By means of a goniometer, the pattern of each signal can be shifted around the horizon to radio-align the airway routes. There are normally four interlocking

loops, thereby bending the course at the beacons to coincide with the airway courses leading east to Bradley and west to Cleveland. The patterns of equal signal strength are shown on Fig. 5 and the interlock index placed at the points of intersection of the curves which are made available to the crews as a reference indicator. The directional radio beacon is shown in Fig. 5 and 4.



Fig. 4—Aerial transmitters, antenna apparatus and high frequency receiver at Cleveland. (a)

intermediate landing fields and at the change of course. The marker beacons of low power and short range transmits its characteristic signals on the same frequency as the adjacent radio range beacons and serves as a local identifier along the route. Six additional radio range beacons are being installed at Boston, Green Bay, Milwaukee, Des Moines, Sioux City, and Minneapolis.

The airway direction finding system, developed with the Weather Bureau, in disseminating weather information along the airways, and maintains 28 radio stations for the exchange of weather information and the dispatch of airplanes. This system of communication is supplemented by telephone and teletype for point-to-point communication. Three radio broadcast stations

signals at Bradley Field, the loop antennas have been placed 90 deg with respect to each other and their end of the interlocking courses have been adjusted to meet the airways leading to Hartford, Beloit and Washington. At Beloit, the pattern of the signal has been altered by the use of a vertical antenna in conjunction with the

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one now operating at Bradley Field, Beloit and Cleveland, and broadcast weather information and landing conditions at the airports and intermediate fields along the route each hour throughout the day and night. Fig. 3 shows the Airways Division standardized radio communication station apparatus. The telephone transmitters are 2,000 watt capacity, based

on alternate field and land with safety to discharge passenger and cargo or as many more favorable weather. The distance co-operation is maintained by means of teletype communication between the operations managers of the transport company and the Weather Bureau office. The radio broadcast stations established by the Department of Commerce will accept any message

Fig. 5—Aerial panel and marker generator as used by the operators of the directional radio beacon at Bradley Field.



Fig. 6—Radio range beacon marking of the route from Cleveland to St. Louis.

required for safety and transmission is to the pilot on flight. A simple receiver aboard the airplane will enable the pilot to take advantage of the radio service established by the Department of Commerce. The radio stations of the Department of Commerce will maintain a constant watch on 333 kc and 4,036 kc for emergency and distress messages from airplanes equipped with transmitters, and will handle any communications required for the safety of flight.

Where air navigation facilities have not been installed by the Department of Commerce or private foundations do not suffice, it is necessary to supplement the service by privately established and maintained facilities. Air transport operators have a positive responsibility in carrying of passengers and mail, and the Safety for the safety of life and property cannot be transferred to any other agency. The air transport operators have therefore requested the reservation of frequencies for their use through the operation of privately established radio stations. A total of 89 frequency channels have been set up by the Federal Radio Commission, of which 64 channels in the 1,900-9,000 kc frequency band have been requested in conjunction with flying the airways throughout the United States. At the hearing of March 11, 1939, before the Federal Radio Commission, the air transport companies requested allocation of frequencies for their use. The basis for the assignment of frequencies to individual states, to be used by any and all air transport operators on the basis of equal rights now and in the future, and to provide for the creation of radio stations for handling this traffic on a co-operative basis in which all participating operators will share equal service, costs and liability. Separate frequencies for night and day use were requested and a conference was held to discuss the matter. It was agreed that a single frequency of 4,036 kc, on which the radio stations will maintain a watch, was tentatively selected.

This plan permits the standardization of transmitters

and receivers by aircraft manufacturers. The transmitters built for airplanes operating on any one route may be concentrated around the frequencies assigned to that route and will simplify communications to and from airmen. The allocation of frequencies to individual routes can be made so as to prevent interference with other routes and the communications problem of assignment of frequencies and operation along the routes is thereby simplified.

An communication to airplane under conditions of poor visibility must necessarily be made by radio, it will be necessary to provide for compensating landing directions at airports by means of the radiotelephone. One frequency for that purpose will be made available free of charge, set up by the Federal Radio Commission. The radio transmitters of airports would have limited power and range not in excess of five miles so as to prevent interference between neighboring airports. Under this plan of having all airport transmitters on the same frequency, the pilot will have to follow directions upon approaching an airport and will follow



The Army Air Corps standardized multi-antennae masts having the type of structure shown in Fig. 2.

the orders as to landing procedure received from the airport manager. The frequency tentatively established for airport transmitters is the 400-500 kc band.

A problem of the future that has received serious consideration is the development of instruments for bringing an airplane to a safe landing under conditions of poor visibility. This must necessarily be accomplished by radio in one form or another. The ground facilities required for this purpose such as leader cables, range locators, or other radio devices for outlining the landing field and taking the airplane over the track of a dir-

approach, are facilities that must be installed by airports in the future and requires the reservation of radio frequencies. Several of the 60 channels set up by the Federal Radio Commission will be reserved for that purpose. In order to accomplish the landing of aircraft by instruments, an accurate altimeter similar to the radio-echo altimeter or capacity altimeter is required and frequencies for that purpose must also be reserved later.

Several such radio altimeters are being developed or have been developed by Army, Navy and commercial engineers. It is not unlikely that they will soon be ob-



A photograph showing the installation of equipment for the compensation of the true compensated by the Service Division of the Department of Commerce.

fined on the market, and recommended as standard installations for all types of planes especially transport planes.

There can be no doubt that air transportation firms now on will depend in a large measure upon radio for its safety and flying efficiency. The radio compass, however, has not long been known as reliable as the all-alloy of fibers, including the long air mail plane and the pleasure seeking, may make use of the service by installing a simple receiving set on the airplane. The time has now arrived when all airplanes should be bonded during construction. The bonding of engines should be undertaken by the engine industry in order that the manufacturer may guarantee the performance of the engine with the shielding installed.

Experiments are now being conducted with NACA type of covering to serve as the shielding for the engine in order that shielded planes may be glorified, thereby increasing the reliability of engines. An airplane carrying passengers should be flown over civil airports without a radio altimeter installed to take advantage of the radio aids now being made available. Regulations making the installation of radio receivers and transmitters compulsory are being considered and will be issued just as soon as sufficient facilities have been installed to warrant these requirements.

Reaching the FOREIGN MARKETS

Through Advertising

BY WESLEY FOWLER

WEIGH THE large increase in United States exports of aeronautic products which occurred in 1936, when 370 airplanes were shipped to foreign countries as compared to 63 in 1935, there may be an unwarranted complacency on the part of the industry in respect to export business. It has come easily in most instances as the result of the feature of publicity attending the record flights of the last few years, but the far-sighted business of our aeronautic industry remains to be done, or, one might say, advertising remains to be done in that of other industries. Approximately 17 per cent of the aeronautic production of this country is exported. Of the 1,500 or so airplanes produced in 1936, but 33 per cent went overseas and to bordering countries. In 1937, the ratio of airplane exports to production was but slightly less to those is really nothing to be proud of in the recent export increase as it indicates nothing more than a normal trend. In other words, the production increased between two and three-fold, so without stress upon the part of manufacturers, exports increased in a similar ratio.

How can this situation be corrected? How can the aeronautic industry obtain its share of the international trade in airplanes? By analyzing the exports of one of our most important competitors we may arrive at a partial solution to the problem. Brazil, with an aeronautic production smaller than ours, exported \$8,000,000 worth of aeronautic products in 1937 compared with our total shipments of aircraft, almost equal to \$10,000,000 the same year at a valuation of \$5,500,000. Among other things—finding the greatest need of credit and the easiness of finding a market aeronautic imports in some of our best markets—the French manufacturers' advantage is the consequence of exports, that it would be unwise for our industry to sell to distributors in foreign coun-



An action picture of a Bell Boeing Boeing. This plane is powered with a Wright "Whirlwind" engine.

tries on a credit basis any more than plane factories should deliver "on tick" to our domestic distributors. The aeronautic industry has been distributing, in so far as the manufacturer is concerned, on a steady cash basis since its inception and this policy has been followed in all export business.

By advertising and/or direct sales policies (the effective application of appropriate sales literature) the aeronautic industry can offset the losses made by manufacturers of other nations in the world markets. It is understandable, of course, for the manufacturers who can afford it to demonstrate their planes abroad. Like both before and after the demonstration, advertising and sales promotion will map dividends commensurate with the thought behind them.

What media are there for advertising airplanes which reach the intended communities of the world, is a natural question. What should be used in addition is, what media are there which will promote interest in foreign countries and subsequently increase the number of potential purchasers of aircraft? The answers to these two questions in the order stated are:

1. The foreign aeronautic trade publications and the direct circulation of pilots, government aviation officials, and civilian flying club members.

2. The general press such as newspapers and magazines.

There is another important class of readers—
3. The American publications having foreign circulation which may be divided into two categories: (a) those catering to foreigners only, which publications may specialize on agriculture or agriculture, but will reach potential dealers, importers and distributors of aircraft; and (b) the regular aeronautic trade press of the United States, some publications of which have considerable foreign circulation.

A description of each of these types of media follows. In reporting the results of a survey of European aviation publications, the Paris office of the Department of Commerce reported the following:

"A survey made with the assistance of the United States Commercial Attachés in Europe and offices of international associations has disclosed that there are about 50 special newspapers and magazines in Europe which publish news for aviation news in Europe, where commercial aviation companies are numerous and every



Front-quarter view of a Wright J.I. powered, Model H, monoplane.
The American Aircraft Company, Inc., U.S.A.

country has a military air service. Such publications exist in 13 countries, and are printed in nine different languages.

"Reflecting the新闻 and energy of the industry itself, the aviation publications of Europe are interesting examples of the trade press—practically all of them carry illustrations. Many have a pronounced popular appeal, with non-technical articles on general aviation subjects. In most of them, advertising matter is not particularly heavy, and among the advertisers represented are numerous automobile and oil companies.

"A notable feature of these periodicals is the international scope of their readers. Even in publications of the smaller countries, frequent reference is made to the important development of aviation throughout Europe as well as in America and elsewhere. Many of the publications are official organs of aeronautical clubs and similar organizations, which might be considered somewhat of a guarantee as to their currency."

A recent document, No. 659 AD listing the European publications with their circulation and reader interests may be obtained upon application to the Specialties Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C. 20580.

Other parts of the world, exclusive of the United States, largely because of the absence of manufacturers, are not so well taken care of with respect to aeronautical publications.

The monthly "Aviation" of Buenos Aires is well-known. A place through a recent issue develops a full page advertising American aircraft and a half page advertising an American aircraft, with three and four full pages respectively advertising French and British manufacturers. Germany which produced her 300 airplanes in 1928 (as compared with our 4,500) was represented in one full page spread.

In Brazil there is the bi-monthly "Aeronautica" and the "Aviacion" published in Portuguese. A recent issue

of the former contained no advertisement for American aeronautical products; there was one full page carried by the agency in Rio de Janeiro for a German airplane and one each for a British plane and engine. There were miscellaneous smaller advertisements, but none with exception of another lubricant ad for American products.

In Chile, Cuba and Peru there are aeronautical journals of larger circulation than the strictly aviation periodicals previously mentioned. The average for the strictly aero-journals, except for Argentina's "Aviation," which claims 5,000, is 2,000 claimed circulation.

In the Antropodes, there is the well-known "Aerofiles" which has a circulation of about 4,500 in Australia and New Zealand and 1,000 overseas principally in the United Kingdom and the United States. This bi-monthly publication with its remarkable advertising rates of \$10 per page and \$26 per half page with a 10 per cent. reduction for insertion in each issue for a year, would be a good medium, if the extent that American aircraft are allowed to enter and be housed in Australia and New Zealand.

It would hardly be worth while to advertise in aeronautical publications in South America, except in Brazil, because of the limited market there. South America's interest in aircraft development would appear that the only method of increasing the value of advertisements carried in the aforementioned publications for that territory would be by trial. The rates, are quite high, varying from about \$36 a page in the case of "Aeronautica" (Brazil) to approximately \$500



A front-quarter view of the Boeing Model 80.

in the case of "Aviacion" (Argentina), which has a larger claimed circulation.

As for the direct circulation of prospects in foreign countries by means of brochures, leaflets, brochures and other literature, a question arises as to how far we may go. Department of Commerce officials advise that the names of pilots and flying club members—those lists that generally all aeronautical centers will be available similarly as a list of governmental aeronautical officials is now available upon request in the Aeronautics and Communications Section of the Bureau of Foreign and Domestic Commerce at Washington, or from the Bureau's district and co-operative offices located throughout the country.

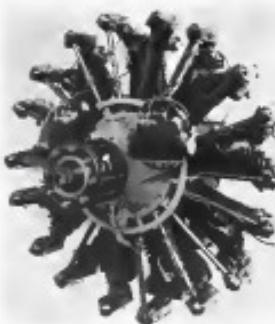
In connection with brochures and other forms of descriptive literature for foreign consumption, it may be said that the appeal of aviation is universal and the more

AVIATION April 8, 1929

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qualities of an airplane or another aeronautical product that would appeal to an American would appeal abroad. A bi-monthly Index of Literature on American aircraft in Spanish has been reported from Spanish speaking countries. In this regard, the advisability of possession of having translations made properly so that they will not be ridiculous. There are capable translators engaged in foreign advertising agencies and by some of the publications carried to foreign readers, which will be mentioned later.

As far as general press, not only advertising but publication may be quite effective. American agents engaged in foreign advertising can recommend newspapers and other periodicals suitable for the advertising of aircraft and kindred products. There are such periodicals as "South America and in the Far East" which publish a number of aviation issues, few of which, it is noted are about United States aircraft and aeronautical activities. It should be realized that publicity prepared by manufacturers should not make too greatly of being "head copy." It should contain facts, and there are plenty of them which would be of interest from an informative viewpoint. The advertising agencies have rates and services of these periodicals and can advise as regard to reader influence which after all is the most important



A front-quarter view of a Boeing "Whidbey" biplane, which is listed as being built at \$11,000.

factor to be considered. A publication which would be read by the sons of wealthy Brazilian coffee growers, or citizens of the Argentine would serve as a logical medium through which to get a message over as to the true living and useful qualities as well as the growing safety of air travel.

There are several well-known publications advertising



The new Boeing Model 80. Four engines, flying wing cabin monoplane. It is powered with a 300 engine.

exclusively to foreign dealers and distributors of lines somewhat akin to the airplane, in respect to the methods by which the foreign readers interested business and the persons to whom they sell. These publications will not be mentioned by name. They are sometimes in two issues, one in English and the other in Spanish. Their translations can be relied upon to present facts accurately in language that can be understood by the listener or the recipient. Other instances of this type refer to general mechanics and jobbers and have departments for special lines of equipment. Practically all of them have accomplished some good work for the aeronautic industry.

And as they have devoted space to aviation without advertising warning it, it would appear that they deserve some consideration when laying advertising budgets are prepared out according to the various effective media. There is no doubt but that this type of advertising is of value in reaching financially able business houses which may logically expand their aeronautic, truck and general merchandise businesses to the handling of airplanes.

The next class of medium is one in which the aeronautic industry is upon advertising extremely, namely the United States aeronautic press including that which refers to the trade exclusively that having popular appeal and that having both. There are about 24 such publications in the country. Not more than five or six have any appreciable foreign circulation. Reports from abroad indicate that they are read with great interest and are highly quoted from aviation enthusiasts to aviation enthusiast and others who are very interested. An example of the practical results of this foreign distribution is cited in the case of a copy of an American aviation journal which found its way to the office of one of the American Commercial Attachés in Europe. Pastured on the cover were several American planes during combat with aerobatics in Paris.

A large company in the European country was interested in favorable distribution and as the result of the photograph was placed in touch with the American manufacturer of the planes depicted as the cover of the aeronautic magazine.

The subject of foreign advertising to promote aircraft sales deserves the consideration of all manufacturers who desire the valuable margin of foreign business which will enable them to keep their factories thriving during seasonal declines in domestic sales. Ten per cent. foreign advertising budget could be worked out on the basis of the ratio of domestic advertising expenditures to domestic sales, of which export sales for 1929 should be at least 10 per cent.

WHAT THE *Exhibitor*

Various Comments on Things Aeronautical as Expressed by the

Boeing Airplane Company, Hamilton Metalplane Division

IT WAS believed at one time there was a large potential market for a cabin monoplane airplane constructed entirely of wood, which would be non-combustive, withstand severe weather conditions and afford maximum safety to passengers and pilots, and with this thought the all-wood constructed Hamilton plane is a result, and it has been built and is in operation long enough to make the designers and company feel well paid for their labor in its development.

We now have planes operating in Alaska which have been flying up as far as Siberia, some in South America, and have recently made another shipment there, and have several fleets operating through the central part of the United States, and in gathering information from both extremes, our planes have proven to be economical to operate and extremely satisfactory to the owners.

The present possibilities for sales on a plane of this type are limited. They have been sold for passengers as well as cargo, but the average flying school operator will require carrying both passengers and mail, and operate under most hazardous conditions in all sections of the country. It appears that the greatest problem Hamilton and staff in the particular type and size of plane that would cover the largest scope of requirements. No doubt time will establish the most desirable type and size of airplane that will lead itself for large volume production.


C. H. Barnard
General Manager

Mohawk Aircraft Corp.

In answer to the Mohawk "Puma," we are exhibiting at the Detroit aircraft show a new model three-place cabin plane with a Warner "Scarab" 110 hp engine. This plane is built along the same general lines as those of the Puma and we believe that it will be equally as popular. The new plane is really of a convertible type. It may be used as both a land plane and a seaplane, and as a cabin or open type. A load plane is an exhibition at our booth, while a seaplane is being used for demonstration purposes. The overall dimensions of the new plane are: length 22 ft., height 6 ft. 3 in., span 34 ft. 11 in. Its weight empty is 1,000 lb. The useful load is 700 lb. The pay load is 370 lb and the gross load 1,700 lb. The plane is finished in cream and in silver color.

Test flights have indicated that the high speed of the plane with full throttle at sea level is 160 mph., the cruising speed 110 mph., the climbing range 600 m., and the landing speed 37 mph. The wing is of the full cantilever type naturally braced and tapered. All fittings are of chrome molybdenum steel, or heat-treated chrome nickel steel. The fuselage is constructed of chrome molybdenum welded steel tubing. Dual controls are standard equipment.



Great Lakes Aircraft Corporation

ONE OF THE GREATEST PROBLEMS confronting the aircraft industry today is the need for a small training plane designed to incorporate every possible feature developed for safety and stability, without undue sacrifice in performance and to sell at a satisfactory price.

The present year will see flying schools established in every corner of the Union, operating under the guidance and having the approval of the Department of Commerce. These schools will be turning out fledgling pilots as fast numbers and experience should be available for every use of these men to continue his sale flying until he has had enough hours in the air to qualify as a pilot. If a student pilot is forced to stop flying upon completion of his first solo his training is soon forgotten in a great majority and more instruction will be necessary when he is ready to fly again.

With this problem in mind, the engineers of Great Lakes Aircraft Corporation designed the airplane that we are showing and demonstrating this week at the All-American Aircraft Show. Experience has shown that the single engine, open cockpit biplane has been training conditions that are very safe. The biplane has shown itself to be safer in the event of a crash and possesses the test of controllability best suited for the purpose. Inter-communication between student and instructor is of great importance, and yet it has been found desirable to have the student alone in his particular cockpit.

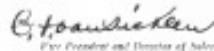
The Great Lakes training plane is powered with American Green, Mark III engine. The Green engine, builder of many international records, is perfectly suited for atmosphere cooling, giving increased performance and perfect visibility, and is simple enough to desire to be serviced by an ordinary mechanic. The fuselage of the plane is of the reliable steel tube type

HAS TO SAY

Exhibitors at the Second Annual All-American Aircraft Show

and is readily accessible for inspection purposes. The wings and tail group structures are of the latest type of metal construction, with the exception of the wing batten which are selected spruce. The trailing edges of the wings are made from sheet aluminum giving a very smooth surface. The fabric type ailerons give the plane exceptional lateral control and the stability and safety is further increased by the use of ring slots.

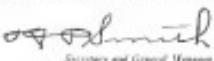
The combination of a low landing speed and a high top speed makes this plane very desirable also for the sportman pilot, and his performance figures show that it is well qualified for this type of flying. While the plane has been built to sell at a price under \$3,000, there has been no attempt to sacrifice quality in any item and a production schedule such as ours is the only justification for this price.


C. F. Haasleben
Vice President and Director of Sales

Bühl Stamping Co.

SEVERAL months ago our company created an Aircraft Division, which is devoted exclusively to the manufacture of exhaust manifolds and nose cooling for aircraft engine manufacturers, air storage gas and oil tanks and miscellanea, waste stompings, all of which we see as eliminating at the All-American Aircraft Show.

We have been very fortunate in securing some very fine contracts from several of the larger aircraft engine manufacturers throughout the country for the above commodities and our plan is to develop this division of our business in accordance with the demand of the trade.


O. J. Bühl
Secretary and General Manager

New Standard Aircraft Corp.

Since the New Standard airplane was first exhibited to the public at the Chicago show last December, developments have been highly gratifying from every stand point. It has been necessary for us to triple our manufacturing facilities and to increase the production which again again to keep up with the orders that have been received.

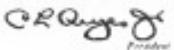
The latest creation of Charles Healy Day has simply

gained his reputation as a designer of airplanes and the truth placed is how by aeronauts who have flown his planes since the early days of the industry. A record of 22 successful ships, setting down the famous J-3 Standard, is the solid foundation of experience on which the present New Standard is constructed.

The success of this plane enables us to look forward with the utmost confidence to the future. We plan to produce a complete line of airplanes. A small nose-drag ship designed specifically for training and expected to be one of the best for that purpose of those on the market is now nearing completion and will be ready to take the air in a few days.

We also expect to announce during the summer as all metal dual engine transport which is expected to have an amazing performance.

The future looks bright—very bright, not only for the New Standard Aircraft Corp., but for every airplane manufacturer whose ships are strongly built and able to perform their allotted tasks efficiently and safely. In the aeronautic industry, an ever halting is the history of mechanical development, quickly comes.


C. L. D. Day
President

Wright Aeronautical Corporation

WE ARE LOCATED IN DAYTON, OHIO, to observe that the aviation industry in America is in a period of sharp transition. Everybody concerned with the industry knows that already. But there are certain aspects of this transition which though of the deepest importance, are inadequately appreciated in our thoughts by aught but the problems of manufacture and economics. One of these aspects—now involved in a profound and subtle change in the relation that exists between aviation and the public.

The time is rapidly passing when mechanical flight through the air stood in the public eye as the marvel of the ages. As that time recedes, aviation emerges more and more impressively as an enterprise engaged in public service similar to the field of commerce and industry. And the immediate hope of aviation lies in direct proportion to the forthrightness and care with which we meet this change. Aviation still retains its great enthusiasm and its great usefulness when military and revenue have disappeared from flight and when it becomes simply a cosmopolitan means of transportation.

This state of affairs will not come about very steadily or of its own accord. It must be produced by the men

the manufacturers and sell airplanes, and above all, by the men who operate them. The public is eager to have flying as simple and convenient a matter as motoring.

Efficiency is a grandly overworked word, and most of us are a little tired with it, until we are about ready to accept the Simple Soch's conclusion that "efficiency means doing a very simple thing with the utmost difficulty." Yet, after all, efficient flying is surely straightforward flying, with minimum and least waste eliminated, and everything reduced to its ultimate simplicity. It is with this sort of efficiency that the aviation industry must meet the public—and it is of the most vital significance on the flying fields in the long run and in the service stations where the public really makes its contact with the business of flying.

In short, the manufacturers of airplanes and of engines have done about as well as they can do under the present circumstances. They are working to improve their products, all round. But, based on the present day airplane and engine, the sound elements in the new transportation are reasonably reliable.

The question, then, is rather sound up in that section of the industry which is in direct association with the public—which is introducing flight to the public or leading citizens through the air. It is up to the men who operate Flying Fields, and all routes of who, in any other way, stand at the connecting link between the machine and the people who are to fly in it.

To the extent that these gentlemen direct their operations and their public contacts with safety and efficiency, promptness and convenience—in that extent will the public take sleep confidence in the new vehicle come to regard it as a commonplace, and make universal use of its manifold advantages.

There are many operators who have succeeded admirably in eliminating loss and higher delay and confusion from the movement of their ships. Many of them have, in fact, made the relation between their planes and their passengers as simple as the relation between a railroad train and its passengers.



B. G. Heighton
Director of Sales and Service

Nicholas-Beasley Airplane Company, Inc.

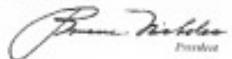
THE TREND OF COMMERCIAL AIRCRAFT MANUFACTURE since the ending of the war world has been more greater and greater horsepower, with subsequent greater top speeds and greater climbing ability. In order to secure the desired speed and greater climb the manufacturers were forced to sacrifice efficiency in pay load and operating expense.

Now, however, I believe that this enormous horsepower trend is changing and that planes will be built with lower power requirements, with a greater pay load efficiency and more economical operating expenses. As the sale of commercial airplanes increases and becomes more competitive, it is a common sense assumption that the airplane must become more efficient from a pay load standpoint and also from the operating cost standpoint.

The average "Whirlwind" job being manufactured

in this country today accommodates only about four people. This figure approximates 33 hp. per person. It is the writer's belief that within the next 12 months we will find this horsepower reduced to approximately 25 to 30 per person. In order to accomplish this greater efficiency and lower horsepower per passenger, there will necessarily be a loss in a certain extent in top speed and climbing ability of the plane. However, this will again be increased by more efficient plane designs.

Commercial manufacturers in the past few years have been influenced to a very great extent by Army and Navy standards. This I do not believe can continue from a commercial standpoint.



President

Pioneer Instrument Co.

AN EXPOSITION OF AIRPLANES, engines, instruments and accessories serves a definite purpose to the industry as a whole. Such displays cannot be counted as mere shows in which all manufacturers have assembled their products to give an interested public a view of the progress of aviation, nor can the exhibitions be restricted in the nature of rooms where buyers and sellers meet to transact business.

In my opinion the ideal aviation show is one where the exhibitors and the purchasers are given first consideration. Each of them has made an effort to present what the Show is here held and many of them have gone to unusual expense to display their products when the greatest concentration of people will afford opportunities sufficient to profit the exhibitors.

From the point of view of the exhibitor alone, the Show should be sufficiently interesting and vital to attract a great mass of buyers who have different purposes and reasons for visiting the exposition. Such men as potential purchasers, engineers, new developments concerned about the progress made by those who supply their work planes, engines, instruments and accessories and kindly consist of all that is presented for their approval.

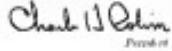
The buyer looks upon the Show as a great concentration of products which he can inspect in leisure and without traveling from one end of the country to another. He can compare quickly, he can see for himself that a plane manufacturer has changed his design slightly so that a new instrument has been added or that improvements have been made in the models he now uses.

Then, to the buyer and the seller, the aviation show has served a very definite purpose. It has saved money for both and it has given each a better understanding of the supply and demand of such equipment as might interest any particular person or firm.

We do not mean to deduce in any way that public interest in a Show is not of value. There are millions of persons in this country, truly interested in aviation and deeply concerned over its progress. They are the people who attend every show; they are highly critical and very willing to advance broad approval of recent developments. A still larger class is composed of the romancers of aviation and the apologetics of flight. They flock to shows and spend many hours looking over each ex-

hibit, never intending to purchase and often having no intention of contributing in any tangible form to the industry. Such people however are carriers of the contagious spirit of aviation and they advocate their beliefs with vehemence and width of a wide circle. They are the type called "air-mad."

A show, however, that appeals to them is filled with dramatic features, such as aerobatic flying over the adjacent fields, quick military maneuvers by Army or Navy fliers and all manner of contests. To strike responsive chords in their worthy heart and forget about the exhibitor and his buyer is not particularly encouraging to the members of the industry who make the shows possible and who contribute their finest products to provide a cross-section of aviation as it is today.



President

Titanium, Inc.

WE SHOULD like to underscore that after thorough trials extending over a period of more than 18 months, Titanium, Inc., now has ready for sale two new items.

One is a first class durable lighter fire free from possibility of cracking or breaking. The other is a very serviceable material called "T-Titan," which finishes with a medium high gloss for finished leather, but which contains none of the ingredients now commonly used in lacquers. It contains no astro cellulose, no gases of any sort or lead, none of the recognized plasticizers, and is practically non-inflammable.

Titanium, Inc. has recently registered for operation in the State of Illinois and the State of Kansas, and has arranged for distribution of its products from warehouse stores under the care of resident salesmen in Wichita and Chicago.

To take care of the production of new materials we have just completed a new factory unit which will reduce the whole of the old factory for clear and pigmented dopes and allow an increase in production of around 60 per cent. Steps are now under way for the launching of Titanium, Inc., in cover this enlarging of our activities.



President

B. Russell Shaw Co., Inc.

THE GREATEST INNOVATION confronting aviation development appears not so much in the selling of the public upon the safety of flying but upon the ability of the manufacturers and operators to bring the cost of flying, and particularly the cost of air transportation to the point where it may be used extensively by the average citizen.

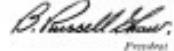
Some of the operating companies have announced that air transportation is a means of travel that will be paid for cheerfully at a high rate, not only because of the speed but because of economies of population but because of the pleasure derived from flying.

In the first instance, our airport locations enter into the price which may be obtained in traveling between points, because it is not the time it requires between airports that interests the traveling public, but the time it requires to reach the city proper and that in turn involves overhead transportation from the airport to the city.

The second reason, that the public will pay the price because of the pleasure derived in flying, for the more part, is erroneous. At least it appears such to the average traveler, and after all is said and done, that is the point that must be reached if commercial air transportation is to succeed. In some localities, of course, there are sufficient business men and pleasure seekers of enough wealth that they will pay high rates for high class transportation. This is evidenced by the earnings of our local bus lines in the United States.

Air transportation must be safe, comfortable and facilities are available, as located and as maintained so the airline operator may assure his passengers of scheduled times, properly maintained equipment and ease of transportation from the airport to the city.

Unfortunately, there are but few airports in the United States. There are many flying fields and if we can prevent the building of airports and air terminals from being made paved footballs and can have these airports and air terminals constructed to meet the needs of everyday commercial air transportation of the largest and newest equipment, then we will have accomplished one of most important things necessary to the development of aeronautics in general.



President

Stinson Aircraft Corporation

THE STINSON AIRCRAFT CORPORATION is exhibiting four planes at the All-American Aviation Show. This is the first public presentation of the new and refined 1939 series, incorporating many new features.

Chief interest prevails around the announcements of the new eight place Stinson-Detroiter, which is powered with the 425 hp Pratt & Whitney "Wasp" engine. This gives the largest version of the famous six passenger Stinson-Detroiter, which is now powered with the new 16-300 hp. Wright engine. Both the large Stinson models have unusually wide cabin floors in the high side cockpited airplanes, and the seats are completely finished with the same material. The cabin areas are fitted with armrests in place of the usual padded cushions. A large baggage compartment is located at the rear of the cabin, and a side with full territory facilities is furnished as standard equipment.

The latest model of the new Stinson Junior, the first model of which was exhibited at the 1938 Detroit Show, is also an exhibit. The cabin of the Junior has been greatly enlarged and the entire plane improved. An optional luggage compartment is placed at the rear of the cabin, between the edge of the rear seat and the cabin walls.

The Junior has been designed to carry a heavier load than the 1938 model. It also may be powered with a choice of four engines. The 110 hp Warner, 165 hp Wright 170 hp. Curtiss "Challenger" and the new trea-



A "Wasp" powered
"Flamingo"
monoplane



A three-engined
Ford transport
monoplane



A "Challenger"
powered Curtiss "Robin"



A J-4 Whirlwind
Bell Standard
"Airscooter"



A three-engined
Keystone "Patriot"

U. S. 13,1306
Filed 6-1930

Cylinder 225 cu. in. Wright air-started windmills. The cylinder is standard for all of the various engines with some engine mounting and cooling changes necessary for the different installations.

All of the new 1929 Stearman models are equipped with metal propellers, hydraulic tail wheels. These improvements have been made. Standard gear of the Standard Metal Model of the Stearman with the Stearman cylinder.

The engine has a chrome gudgeon pin bearing, cylinder block to the pilot seat, and a separate internal expanding bushing mounted independently from the cylinder head on standard oil all models.

The lateral opening of the side Shirokin intake is 8 in. on each of the planes and visitors have access to the rear building by the other side. The new factory is located on the Wayne-Denton Municipal Airport at Wayne, Michigan, and is a single-story brick construction. The new factory is 380 ft long and 180 ft wide and has a total floor space of 25,000 sq ft.

E. I. du Pont de Nemours & Co., Inc.

Interesting literature describing Oakite materials and their practical applications in aircraft construction problems is being distributed to those who visit the booth. There is time available to view the show and obtain this literature by writing direct to Oakite Products, Inc., 22 Pleasant St., New York, N. Y.

R. A. Epple
Oakite Products

General Electric & Mfg. Co.

The Westinghouse system is exhibiting both airport lighting equipment and new Marconi aircraft accessories. The lighting equipment consists of character lighting, tall floodlights, beam search, directionals and approach lights, search lights, night and power plane lights, tower lights and a search generator.

Marconi recently produced twelve several sizes of Marconi spotlights, control panel, power laggers, fairleads, self-shield shield and decking for interior board of colors. An unusual Marconi exhibit consisting of a model airplane with a 9 ft wing span, constructed entirely by Marconi and driven by two 31 hp electric motors, is also on display.

J. P. Dewartz
Sales Manager, General Electric Co.

Consolidated Instrument Co.

UNIVERSAL AVIATION IN THE UNITED STATES might almost say, is the world—since the ending of the World War. A little more than ten years ago, has been marked in four places of beauty. These might be best known as follows:

First—the passing of short fusing. Started—a period devoted to the production of public consciousness to the inherent possibilities of flying. Continuous development of safety factors, and improvement of existing plans, and improved designs. Fourth—occurring in the last year.

The beginning of the present year seems to be the period of birth of these first three planes. Start from the creation of long distance and trans flights, as exemplified in the historic over-the-night flight of Captain Lindbergh and the record flight of the Spirit of St. Louis, served to immensely public interest in all phases of air transportation. In short the public was sold on aviation as a practical means of travel.

But we in the industry still had—and have—with many problems concerned with proliferation. Some of these have been solved, others await solution. But there is, and will all truth tell, apparently, strides have been

made, and continually are being made, toward placing the aviation industry as a sound production concern and financial basis.

This present-day trend toward the making of allied interests in the industry I believe to be the most significant and progressive move that has taken place since the first flight of the Wright brothers at Kitty Hawk, N. C. That this merger movement will stimulate the entire industry, without even a doubt, it promises, for one thing, the entry of the industry into a production boom for the first time in its history. Evidence of this are already appearing particularly in the airplane insurance field, where there has taken place recently the merger of three important research and manufacturing organizations with that of one own company, backed by important financial interests.

And it may be asked, what will the entry of the industry into a production boom mean?

It is bound to improve manufacturing and design methods, rendering eventually lowered costs of the finished product, as well as a better product. With production established, we are bound to follow further in the steps of the automotive industry in establishing assembly-line facilities. Courtesy to the industry will establish standardization of manufacturing methods and standardization of parts. As an instance of this, we have again in our own field instrument boards that are interchangeable with one another, and individual instruments of standard designs and size made to fit any position or board.

That it may be said, with production and standardization methods as well underway at the beginning of 1949, the greatest industrial problem that has ever confronted the country is well on the way toward complete solution.

Davis Aircraft Corp.

DAVIS AIRCRAFT CORP. is looking forward with confidence to development in the light airplane field within the next few years. Only regional and semi-regional studies made within the past two years in large passenger and cargo carrying airplanes. It is a development that is in fact steady under way and rapidly gaining momentum.

We are not overlooking the development of the "flying airplane," which the newspapers regularly predict will soon be minimally evolved and produced by the tens of thousands, but the development of the thoroughly sturdy, smooth and reliable light airplane of medium-sized cost and low operating and maintenance expense.

Flying schools are already feeling the need for such a plane. It will reduce their training costs, permit a reduction in fuel and probably bring in a substantial number of students. Another, and growing source of demand for such a plane is among those who have received their elementary flight training, and desire a dependable, but moderate priced plane for their personal use, or to increase their number of flying hours to the point necessary to obtain higher grades of licenses.

The Davis management, formerly known as the "American Monk," is the result of much dogged work and con-

tinuous flight testing, specifically directed toward the production of a plane of moderate price, able to stand punishment and possessing inherent stability characteristics associated only with much larger and more expensive planes. The reception with which the plane is meeting with both schools and private owners, we believe is a confirmation of the possibilities which our survey of the situation led us to expect, as well as an indication of a strong general interest in aviation which will benefit the industry as a whole.

Besides myself, "Put" Lowe, superintendent; T. J. Paluszak, purchasing agent; Will W. Rader, secretary; J. C. Gregory, salesman; Fred Pfeifer, test pilot; and Leo Marotta, field manager for the company, we are in charge of our exhibit.



President

Alexander Aircraft Co.

LIKE THE SMALL AND INVALUABLE light airplanes are within the means of almost everyone and suitable for so many useful purposes as in reality a steady and growing demand. The demand for Engineering has been so great that we find it hard to say which type of customer makes the best market. Our three place biplane and four-place-and-a-half "Sister" have found suitable for any class of service up to a payload of 750 lbs. We do not intend to go beyond the 750 lb. payload limit in the new Model line at this time.

It is gratifying to see the growing number of private owners. We like to call our ships "Happy" planes. They fulfill this important need. Long term loans are coming to support increasing motor sales along dusty roads or crowded highways. After a hospital Sunday dinner, proud families fly their families to visit friends in the next state and get back in time to tend the refrigerator in their own homes.

Another sheet of paper being about this happy state of affairs. They enable the general public to acquire itself with aircraft construction, aircraft types and flying knowledge. They are a magnifying glass through which the public gaze is concerned an individual shape themselves. So many requests regular exhibitors are more important to stimulate than to entertain, for this reason.

Everybody, including the slow moving politicians, comes in more or less close contact with automobiles every day. They are always on parade, especially when they try to cross a street. Airplanes are not so close to the public—soberly aware by stock several thousand feet high. They must always be circled at long distance by people who witness our flights.

At the shows the public is free to swarm around the planes, look at the different makes, peek in the cockpits or cabins and note the witty contrivances and clever hints of modern aircraft.

As I have often said, the great problem confronting aviation today is the development of the fair one a reliable completely trained pilot. The airplane production capacity of present and future factories are far beyond the capacities of the present supply of pilots to fly them

It is easier to build a plane than to train a pilot. I am confident that this condition of affairs will automatically be taken care of.

The big feature of our exhibit at the All-American Aircraft Show in Detroit this week is the new Biagiardi Star 1000 monoplane, unique from people and a thing to the design of this ship we have striven for three principal features, safety, speed and comfort.

We have concentrated safety in the Biagiardi by increasing the factor of safety in construction, and by designing it for quick take-off, low landing speed, a wide range of visibility, and extreme positive controllability under all conditions and particularly at the landing point.

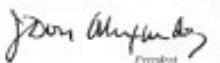
Speed is achieved by removing everything possible from the air flow and landing it away under cover. Even the landing gear disappears completely in flight. Good design has made the ship extremely light for its load capacity without sacrificing the strength.

We have arranged for the traveling comfort of our customers. There is plenty of leg, head and elbow room for the four people in the cabin. And we have seen to it that the dog enjoys as much comfort as the four people. We are giving passengers a feeling of surprise rooms. They are not pleased usually together as best in cramped quarters.

The broad wing spans give the pilots and passengers a wide expanse of the country below. The long expanse of wing surface from the cabin windows is necessary to a third passenger. It is also comforting for the passengers to rest upon the solid metal frame of the wing rather than having to sit on the overhead.

We have constructed for a large supply of economical air cooled engines. The low gasoline consumption of engines required by the Biagiardi fully loaded makes it a good ship for the private owner and the small airbus operator. It climbs fast to a safe altitude, and its controllability makes possible many short passenger runs in a given time. We are installing an extremely simplified seat belt control system. There are no wrist or finger arm bands.

Our distribution in Michigan, Willis Kyser, is exhibiting one of the first models at the big exposition this week. He is taking personal charge and will keep a large supply of materials on hand to show the fine points of the plane to the crowds.



President

Berry Brothers, Inc.

ATTENTION AT THE DETROIT SHOW is focusing on the airplane catalog of Berry Brothers, manufacturers of Berryfield Aircraft Products. This catalog now devised which is designed to increase airplane sales and facilitate the selection of suitable color combinations in display for the first time in the Berry Brothers' booth.

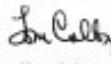
The colorograph consists of two exhibited interpretations, one showing a halftone illustration of typical biplane, the other a special panel color which is applied to plane beneath the exhibited overcoat, showing through white-out areas, gives two-color camouflage effects. The airplane project is also to choose the combination that best fulfills his need or suits his taste. Both the

monocolor and biplane have 15 different color effects. The transparencies and cards are mounted in a handsome portfolio. Berry Brothers are preparing a sufficient quantity of colorgraphs to supply one to each aircraft manufacturer who is doing large-scale aircraft production.

Another important feature of the company's booth

is a model road plane in appropriate colors designed to have a maximum background. The chassis of flight is road striking. Twenty-four large door panels finished in Berryfield color combinations complete the Berry Brothers' exhibit. The booth is attended by Tom Colby, manager of the aviation division, Tom Murphy, assistant manager, Louis Petrey and Ben Cone, visiting observers; Harry Williams, manager of the St. Louis Branch, and the following aviation representatives: Louis Harrik, California; George Condrill, Buffalo and Cleveland; Arthur Clark, New York; George Schlegel, Wheeling; W. J. Springfield, Minneapolis; Herbert Langford, Philadelphia; R. T. Soper, St. Louis; J. H. Berry, Wichita; and Gordon Staton, Tulsa.

Berry Brothers' headquarters are at the Detroit-Leland Hotel. The company is holding open house at Chateau Voigtman, a new aviation and country club on Grosse Isle that has excellent landing facilities.



Manager Marine & Aviation Department

Spartan Aircraft Co.

THE MAJOR OBSTACLE facing the airplane industry today is the problem of mass distribution. The problem of quantity production is important, but there is no use in building a lot of airplanes if they cannot be sold.

In the past, the airplane manufacturer has been in a peculiar position. The cost of building airplanes has been so high that it is easier to keep his planes down where the cost could be held at all, the manufacturer has had to limit his commission to the dealer. Many companies have gone ahead and built a lot of airplanes and then placed the whole burden of their distribution on their dealers or distributors, allowing them a discount averaging about 16 per cent. The problem of quantity production has been worked out to a point where it is only good financial backing could start an airplane factory and build a lot of planes. But after building them, the usual procedure has been to place the whole burden on a group of, or the whole, incorporated dealers, allowing them a meager compensation for their work. If a dealer hires a pilot, rents him a ship properly and does over a minimum amount of advertising, it costs him from \$3 to \$5 per hour to operate.

In view of the fact that the airplane business is still new as most dealers, they must be allowed to go a bit steady at first. The dealer should be given an even break and not saddled with too large a profit. In addition, the manufacturer must realize that the largest responsibility for his distribution rests with him. By national advertising, co-operating with the dealer in the way of furnishing him with sales data, brochures, bulletins etc., and by personal contact with the dealer at least every flying day to help him with his problems,

Left: The new "Cyclone"-powered Stearman biplane

Below: A Whirlwind E. M. Laird mail plane



AVIATION April 6, 1929

and to visit his hot prospects with him, the manufacturer can give the dealer a chance to get his feet planted and help could for fifteen sales as well as manufacture sales. In short no one will know more thoroughly how to apply this principle than the manufacturer himself. It is not a question of "How many planes can the dealer sell, but how many planes can we help him sell?"

The Spartan Aircraft Co. is offering a complete line of planes for \$225, namely: a light but rugged tandem biplane, tricycle gear, equipped with a 40-hp enclosed engine; a 3-place open cockpit biplane, a 120-hp Cirrus Challenger job with Gnome gear, tricycle wheels and brakes, complete instrument panel and metal propeller; and a 4-place dual control cabin job with Wright Whirlwind engine.

However, the Spartan Company realizes that it must depend on a legal and efficient group of dealers to market this line of aircraft to make money and that if these dealers can't make money, neither can Spartan. Therefore our new plan for dealers is to stimulate and continually assist our men based on the maximum discount possible at this time, plus a very complete system of dealer cooperation.

The Spartan Aircraft Company has a million dollar factory at Tulsa, Okla., an engineering department second to none and a fine line of quality ships with prices slightly below the market as a whole. Its expansive dealer plan for 1929 will put it in the prominent forefront of the aviation industry.

S. R. Sooley

Chance Fought Corporation

THE ENTRY OF THE LOUISIANA COTTON SHIPS in the Detroit Auto Show promises again to be a feature of the Show. This company is exhibiting one of the last of its famous Vought "Corse" series planes, arranged with the new Vought amphibian gear and Hanley-Parr slotless wings. In addition pictures of Vought planes at work and wartime patrols of its contribution of Vought planes to the Long Island City Plant are also being shown.

The plane exhibited is the same type as the planes which were recently supplied the Mexican Government except that the Mexican planes were equipped with after-burner instead of supercharged ratings gear. These planes, as supplied by the Federations, are still flying the sky, and the Vought planes at the U. S. Marine Corps' Nicaragua are also continuing the use of high-performance planes of the Vought type all power effective.

The Vought type amphibian gear, in connection with the Vought "Corse" 2-place observation plane, has become the standard type used by the U. S. Naval Air Service, a large number of these planes having already been delivered, and were used in the aerial race from U.S.S. "Saratoga" and "Lexington" in the recent contests. The amphibian gear is inherently simple in design, resulting in an all-around performance greatly in excess of that shown by former types used for the same purpose. Planes using this gear are quickly mo-

vable back to strategic harbors, which, in emergencies, makes immediately available our Air Service planes of the highest possible performance and safety in the shortest possible time, insuring the maximum safety factor of being able to land either on land or water.

The Vought exhibit is particularly interesting to the people of the middle west because the Chance Vought Corporation is the largest manufacturer of airplanes for the Naval Air Service, and it gives the visitors at the Show an opportunity to see the quality of aircraft used by our Navy. The number of Voughts in the Navy service exceeds, by a wide margin, the numbers of any other type, and during the fiscal year 1928 over 3,000 miles more than by U. S. Naval personnel in planes of that make, over in size, those in the next type. In addition to the Navy, Vought planes are in service in the Air Corps, the Coast Guard, and the Argentinean Cuban, Persian and Mexican Air Services.

The Vought company is one of the oldest airplane manufacturers in the country, having an enviable record as leaders of noteworthy advanced types of airplanes. During the period of the World War organization of the company's air service pilots, formerly employed by it in 1911 in the old Wright machine, and has devoted his entire life to the advancement of aviation.

This background and excellent record has resulted in the Chance Vought Corporation recently becoming a unit in the United Aircraft & Transport Corporation, the largest and one of the best backed organizations in the rapidly expanding aircraft industry. The other units of United are the Boeing interests, the Pratt & Whitney Aircraft Company holders of the famous "Wasp" and "Hornet" engines, and the Hamilton interests.

P. D. Baile

Assistant to the President

Metal Aircraft Corp. of Cincinnati

IS THE VULCAN PLANTON the Metal Aircraft Corp. of Cincinnati offers to the aviation public a solution of the serious problem of how to attract sufficient traffic to utilize intensively the lines available? The key to this problem lies, of course, in the density of population, in lower rates, more frequent stops, greater comfort and comfort for the passengers. We have seen a tremendous increase in interest in traffic from three of these conditions, namely, their ability to offer more frequent flights with reduced rates, to give much more frequent stops than railroad service, and to enter the comfort and convenience of their passengers.

All of the conditions that have helped to build up inter city bus traffic can be accomplished with the All-metal PLANTON. For instance, the PLANTON can carry a pilot and seven passengers with ample luggage at a flying cost per mile less than railroad fare. Even these liberal allowances are made for administrative overhead, selling expense, low capacity load and fixed costs for the stockholders, the cost per passenger rate will be comparable with railroad fares plus Pullman.

The moderate first cost of this durable Allmetal transport plane makes it possible to fly sufficient seats for a loss to permit of frequent trips between the cities.

This feature is of great importance in building up the volume of traffic, because aviation drives its patronage from so many sources that a restricted clientele does not meet the convenience of the diversified passenger list.

In studying the conditions that traffic managers are meeting in soliciting passengers they stress the importance of lower passenger fares to increase the volume of traffic. It rarely occurs to them that the public is getting sufficiently educated on the safety of flying in modern planes but that the real obstacle to air travel is the excess weight here that has been necessary to date past. With the lower fares made possible by All-metal PLANE MANUFACTURERS THE public is becoming well educated in the characteristics of many of the present day planes and it is natural that the public desires the increased safety and decreased fare risk associated by All-metal planes, just as steel buildings are preferred to wooden ranches.

This year will see many general managers confronted with demands from their stockholders on paying dividends on the generous amounts which have been authorized for operating losses. Stockholders want dividends, not alms, and in the long run will select as managers men who can best solve the problem of risking dividends for the stockholders. To the management in particular the low operating costs, reasonable first cost and long life of All-metal equipment strongly appeal. For instance, with an All-metal PLANE having an depreciation alone approximately equals the fuel bill. The lower maintenance of All-metal represents a saving about equal to the pay of a good pilot for two or three months. The consistent performance of the metal-clad and metal-leather PLANE can be maintained for many years. These are some of the heaviest items of expense on the profit and loss statement. By decreasing them as well as increasing the volume of traffic by the low rates made possible with All-metal PLANE manuf. managers and operating managers will be invited in showing dividends for their stockholders.



W.H. Parker
Director of Sales

The Goodyear Tire & Rubber Co.

With regards to our exhibit at the All-American Aircraft Show we are displaying a full and complete line of all types and sizes of aircraft tires and tubes together with aircraft rubber accessories such as shock absorber diaphragms, struts, grommets and aircraft specification gophers and radiator hose.

We, of course, are in a position and have an organization to maintain contact with the engineering and purchasing divisions of all aircraft factories with regard to the original equipment item requested for the manufacture and delivery of airplanes. This company has been producing airplane tires since 1928 or 1929 and has always been leader and in the forefront among aircraft makers. Naturally we have kept pace with all developments and at the present time have a full line of all types and sizes of aircraft rubber to offer to the industry.

Some little time ago it was noted that the rapid expansion of the use of aircraft would soon call for some

method of distribution which would permit replacement tires and other rubber products to be available on the airport. We therefore immediately developed the Service Station dealer proposition which is open to dealers of airplanes on airports for the handling of airplane tires and tubes. A large number of such dealers have already been established and, as usual, we believe that we have fairly well taken care of the market now toward distribution of airplane tires and tubes.

We believe that this type of distribution is desirable on engines and parts of all types and believe that the engine users and operators and also liaison sales representatives of each service are the rubber requirements which in many cases will no doubt be a leader and a source for the establishment of similar distribution on other particles.



L.O. Smith
In Charge, Aviation Division,
Research Department

The Dayton Manufacturing Co.

Over the very little attention has been paid to the exterior trim of cabin airplanes, and passengers have been forced to ride in comparative discomfort to calm anything but pleasure in appearance, however within the last year we have seen great improvements in this respect and most designers have recognized the necessity of providing comfortable and attractive interiors.

The first and most natural place to turn for information at this point was to the automobile manufacturers but it was soon found that for the most part automobile and bus equipment was not adaptable to aircraft, neither were interior or exterior fittings. A completely new had to be developed, and it was only within the last year that such material, especially designed for aircraft use, has been available to aircraft builders.

Automotive hardware, door locks, etc., are used with some success on the smaller planes, but this type of equipment has proven extremely unsatisfactory for use on planes of larger size. After the failure of plane locks we have now several types of door locks available with aluminum cases and concealed knobs.

Latency equipment is no longer a problem as there is considerable material available at the present time and new designs are being constantly brought forward. Aluminum bushings are not recommended except for use on extremely small planes where even a pound or two can be spared in the case of appearance and durability, and even if aluminum bushings must be used they should be properly dimensioned. Clamped aluminum latency equipment never presents a neat appearance, cannot be kept clean, and is very unsatisfactory due to its susceptibility to corrosion. To do the best form of bushing is made of a light gauge nickel-plate or other white metal upon a base of beech wood or plywood filled for lightness. This type of stand will weigh in high pitch, is very easily cleaned and is extremely durable. Such bushings may be obtained at a number of firms, and may be equipped with aluminum fasteners for hot and cold water. Due to the weight factor, the fasteners should be made of aluminum, except where they are used for draining water tanks, and in any case should be of the self closing type in order to conserve the water supply. For the smaller planes there

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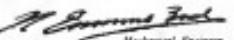
are two types of aluminum folding mechanisms which take up an extremely small space when not in use, and which apparently do not present any complication.

The first is a water supply in cans which when on most planes by mounting a suitable tank directly above the radiator. The tank is equipped with a self sealing aluminum baffle which carries directly onto the hood and by substituting a bronze or brass faucet the same tank may be used for drinking water. Here again aluminum tanks should be used only where it is absolutely impossible to carry the slight added weight of insulation and never for drinking water. The problem is very nicely solved on some ships by the use of a watertight in which the tank is an integral part of the stand, several types of which are now on the market. Removable gravity tanks made are used on most of the larger planes and in this case the tanks should be built into the washroom.

Cheated dry roofs especially designed for aircraft are solving the toilet problem very satisfactorily. These consist of an outer shell of aluminum, and a removable inner basket which carries the supply of soap and deodorant and disinfectant. A light wooden seat is mounted on top and either a hinged wood or pressed aluminum seat is used. The form of holder is such as to use on the market made to fit any form of aircraft dry roof and weight about ten pounds complete.

For the extremely large jobs there are available aluminum refrigerators and other equipment using dry ice as a cooling medium, and we have promise that a light aluminum electric stove will be on the market in the near future. The designer need no longer worry over electric lighting fixtures for his ship, as there are already several manufacturers making aluminum dome lights and attractive light weight seat brackets.

With all of this material available at the present time and the many new designs promised, several designers should have no trouble in bringing out ships that will rival the most luxurious motor coaches in points of attractive interiors and provision for the comfort of passengers.



H. Edmund Beck
Mechanical Engineer.

Keystone Aircraft Corp.

THE TWO PRINCIPAL COMMERCIAL PLANTS maintained by the Keystone Aircraft Corporation are, namely the "Patriot" and the Keystone-Loring Aeroplane "Air Yacht." Both of these planes are being displayed at Detroit during the All-American Aircraft Show.

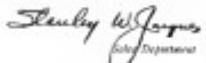
The "Patriot" will be held up to the public eye from the Pacific Coast. A soft-top four passenger aircraft, it is fully equipped for transcontinental flights. The "Air Yacht" is a large commercial transport craft in this country, a newly completed and is expected to play a very active and considerable attention. The plane has visited Washington, D. C., Dayton, Ohio, Cincinnati, Ober, Indianapolis, Ind., St. Louis, Mo., Kansas City, Kansas, Wichita, Kan., Tulsa, Oklahoma, Oklahoma City, Okla., Dallas, Texas, Fort Worth, Tex., El Paso, Tex., Phoenix, Arizona, Los Angeles, and San Francisco, Calif.

The three Wright "Cyclone" engines have functioned perfectly during the tour, according to information received from Capt. St. Clair Street, pilot of the

Patriot, and Kenneth G. Prater, who is in charge of the "Air Yacht."

The Keystone-Loring aeroplane, "Air Yacht," the first of a series to be placed in service early this month by the Thompson Aerocar Company, air mail contractors in the Great Lakes District, for passenger carrying between Detroit and Cleveland, is an exhibit by that corporation on the floor of the Exposition. The machine is a strictly stock model.

Representatives of the Keystone Aircraft Corporation attending the Exposition are Edgar N. Park, president; Albert P. Loening, vice-president, C. L. Johnson, vice-president; C. Tibet Porter, vice-president; Greer Loening, director; Stanley W. Jacques, Sales Department, Eng. Harold, Sales Department, and Walter C. Lee Beiger, Purchasing Agent.



Stanley W. Jacques
Sales Department

Normo-Hoffmann Bearings Corp.

One example at the All-American Aircraft Show in Detroit is featuring a number of special design developed particularly for aircraft use, in addition to our regular line of ball, roller and thrust bearings we are showing one type XLS ball bearings and type RXLS roller bearings, the latter being a new series consisting in association with the former and brought out especially for the aircraft field where weight is such an important factor. The bore of these bearings are disproportionately large with respect to the outside diameter and for many applications they are ideally suited. These bearings will appeal to designers confronted by space limitations which preclude the use of standard bearings as well as to those seeking minimum weight per horsepower.

On display are a number of craftsman-built bearings adapted upon them to show the various characteristics of bearing design as typical radial, angular, thrust, etc. Some of these are from engines more recently put into production like Memphis Conect and the new Continental and Shirley. The use of full bearing on electrical equipment is also being demonstrated.

Another of our interesting exhibits is that of several types of synchro-synchro which is the high speed universal type as well as the slower speed Roots type or worm gear type. The high speed synchro-synchro requires high rpm requirements, i.e. precision ball bearings which are required to turn at speeds up to 30,000 r.p.m., accompanied by considerable gear vibration constituting a difficult problem from the standpoint of bearing design and lubrication.

Aircraft radio equipment is represented by radio governors, tone attenuators and variable pitch propeller drives for radio generators. The well known Delairair constant voltage propeller mounting is on display.

Among aircraft instruments fitted with ball bearings there is being shown earth witness compasses, air distance recorders, inclinometers and the like. In line with the tremendous interest shown of late in the application of ball bearings to control surfaces and other similar parts, there is a special display of control pulleys with

Right: The Davis "Redhead" monoplane with LeBlond engine



Below: A "Wasp" powered Fairey 2T monoplane



Right: A three-engined Fokker F-10 transport



Left: A Vultee-powered Nohawk "Plane"



A "Wasp" engine
Hamilton All-Metal monoplane



ball bearing which are fixed in such a way as to render them as effect an integral part thereof. The ball bearings used for this type of application are equipped with protective side plates for the exclusion of foreign matter and the retention of lubricant.

The following manufacturers are in attendance: Morris, O. P. Wilson, H. J. Ritter, D. E. Betzold, F. W. Moulton, Major Haworth, T. J. Butler, C. H. Walker, T. M. Kaine, R. B. Heider, and C. D. Johnson. Hotel headquarters are at the Devon Leland

O. P. Wilson
For President

American Eagle Aircraft Corp.

PRINCIPAL AMONG THE SHIPS IN STORES FOR immediate and soon type aircraft today, in my opinion, are the barnstormer, the flying school operator, the aerial taxi service operator, the aerial photographer, crop or fire duster, aerial advertising, etc., private flying clubs, the sportman, business and industrial concerns whose officials and representatives travel north, regularly, and short haul air mail and passenger lines. The sales field also includes regular air mail, express and transport routes; but these are, I am told, specializing in the heavier and the sparser types of machinery, planes which have annual pay load carrying characteristics.

The other sales outlets for you will be in those stores which are engaged in the sale of airplane parts or equipment, especially that ray which finds field of transportation. Sales to business and industrial concerns will be in large numbers, and I believe this will be one of the fields most acceptable to expansion. Sales will be made to large numbers to flying schools and aerial taxi operators, and the old-time "barnstormers" still will be a factor.

I consider aircraft shows an invaluable aid to the industry. It is possible for the manufacturer with a complete line of airplanes to show its advantages, the outstanding features of his plane to his distributor organization. It is possible in aircraft shows to bring up new distributors and dealers, for shows attract first of all persons no longer merely aviation, but anxious to affiliate themselves with the industry. Aircraft shows, too, are a great field of good in promotion of "barnstorming." The liaison cause will walk through the aisles in an airplane show without becoming thoroughly associated with the idea that aviation no longer can be spoken of in terms of "sport," but just now it is a power factor in transportation.

Selling aviation to the general public is highly important. In fact, I believe it is of prime importance, for when the average man and woman come to look upon the airplane as a commodity, a type of transportation commerce, unquestioned, much of the missionary work so necessary to the industry will have been accomplished.

I consider development of the sales organization the major problem today confronting the aeronautical industry. Increasing the right type of distribution and dealers in entering the aviation field is a problem which requires very careful study. The need is not for super-sellers. Men, the need for aggressiveness and a knowledge of the airplane and how it can be applied to the needs of the prospect. Today there are a myriad

prospects who can be sold airplanes if the right salesman makes the call. It is my opinion that men engaged in the automotive sales field are ideally fitted for the aircraft sales field. They long have been engaged in selling transportation, and that is exactly what the aircraft salesmen is required to do.

The sales for sports use, for flying schools and to the barnstormers will be as a "volume eng." of goods compared with sales in the transportation market. In this latter field it will be necessary to sell transportation, first of all, and to develop the demand also. This need not be so difficult, for the business man, in industrial firms head, will be quick to realize the importance of having a man whose message is braided in series of dollars.

The outstanding features of the American Eagle Aircraft Corporation's exhibit at the Detroit All-American Aircraft Show include: line of all airplanes which are "flying cars"; line of aircraft extremely rugged; ten American Tag airplanes are built with the "eye value" angle always in mind. They are comfortable to ride in and replace with conveniences.

E. E. Patterson Jr.
President

St. Louis Aircraft Corp.

THE CORSAIR, a monoplane of cabin type, monoplane and more efficiently than any other field of transportation. Sales to business and industrial concerns will be in large numbers, and I believe this will be one of the fields most acceptable to expansion. Sales will be made to large numbers to flying schools and aerial taxi operators, and the old-time "barnstormers" still will be a factor.

Articipating the individual needs is to travel the St. Louis Cor. Co. powers in the manufacture of transportation equipment, recently re-entered the aviation field and brought out the Cor. of the All-American Aircraft Shows.

Articipating the individual needs is to travel the St. Louis Cor. Co. powers in the manufacture of transportation equipment, recently re-entered the aviation field and brought out the Cor. of the All-American Aircraft Shows.

The Cor. is designed to comfortably accommodate two persons. The enclosed cabin has an comfortable-type seat well upholstered and comfortable leg room is provided for both pilot and passenger. Reference to the cabin is through an internally wide door. Windows of Chromite, an air-tightened, synthetic glass provides wide and easy vision around visibility being possible through a slighting at the top of the cabin.

Construction features of the Cor. make it ideal for training purposes, as well as a means of transportation; there are two sets of control sticks, and through a central console the two sets of sticks may be freely interchanged. On the right side is a switch and from the switch which is normally designated for the pilot. The controls are direct cables being used only for the rudder. The standard regulation instruments, which are part of the regular equipment, are enclosed under a single glass panel, as is the practice in modern aeronautics design.

The fuselage is of drawn aluminum and 30-38 exclusive steel all in accordance with Department of Commerce requirements. The wing is of spruce spars, beam construction, covered in the fuselage, with the highest grade airplane fabric. Two aluminum gasoline tanks, each having a capacity of twelve and one-half gallons, are built in the wing, the tanks being conveniently located for refueling. The oil capacity is three gallons. Tires and assembly is of micarta wheel design. Split type landing

prise is of spring pneumatic construction. Internal expanding blocks are also standard equipment.

Powered with a four cylinder air cooled Lycoming engine of 65 hp., the Cardinal has a top speed of 105 m.p.h., cruising speed 85 to 90 m.p.h. and landing speed 35 m.p.h. The Cardinal wing has a span of 22 ft. 4 in. and a chord of 60 in., representing an area of 162 sq. ft. It has an overall length of 20 ft. 7 in. and an overall height of 7 ft. 10 in. The weight empty is 825 lbs. and the payload load is 600 lbs. The wing is wired for navigation lights and fitted for air speed indicator. The stabilizer, which may be adjusted in flight, has a range of from two degrees positive to one degree negative. Dartnell propellers are standard equipment. The color scheme is an attractive arrangement of cardinal red and silver.

EDWIN B. MEISSNER

Dayton Airplane Engine Co.

The DAYTON BEAM, which the company is exhibiting at the show, is a four-cylinder vertical air-cooled engine designed for use in light airplanes. One of the features is the use of an aluminum alloy head on a nickel-iron case cylinder. The engine is statically built with no radial bearings or antifriction arms. It develops 110 hp. at 1,300 r.p.m., or 120 hp. at 1,320 r.p.m. The bore is 4.5 in., stroke 7 in., and displacement 448 cu. in. The engine with the dual magneto, propeller gear, and necessary accessories weighs complete 375 lb.

The popularity of the little engine is shown by the fact that the company has received orders for more than 500 of them this year. Fortunately, the place of the manufacturing company is of sufficient size so that production may be increased. The company is headed by R. R. Grant, who has been connected with airplane engine development for the last 20 years. He is known particularly for his work during the World War when he served as an aeronautical engineer with the pro-
gramming department of the United States Air Service.

Whittemore Manufacturing Co.

THE ACQUISITION of the Avro Avian marks for the construction of the Avro Avian in this country by the Whittemore Manufacturing Co. offers in a distinct type of domestic purchasers an opportunity to buy a plane which incorporates those qualities sought after by the pilot sportsman.

Although we do anticipate a day when the market will be composed of more struts than the wacky spectrum at the present time he is the fad which gives a highly desirable up-to-date popular use of aircraft.

From the experiences of the British builders of the Avian we will guide ourselves in a great measure. We will approach the market much as they have approached it. We will offer the same inducements and appeals.

The design of the plane is one which should meet with wide appeal. The craft has folding wings which have obvious merit. It has the Handley-Page slots which have proven themselves in many instances and are particularly suited to a plane as light as the Avian. It is a plane

which is constructed with the finest understanding of control and a fine application of that comprehension which is substantiated by Lady Mary Heath's statement concerning her special solo flight.

The purchase price of the Whittemore Avian will include the well-known 95 hp., 4-cylinder-solids Corsair Mark III engine. We have an interest second in that country of the selection one of an engine which is worth quoting. William H. Hooker of Beynold, L. I., kept a record of his expenditures for a period of five months. In that time, his plane was in the air 79 hrs. and 29 min. and ground time added to that was 23 hrs. and 17 mins. The engine used 350 gal. of gasoline and 24 gal. of oil. Miscellaneous expenditures totaled \$41.84. It is estimated that he covered 7,190 miles in that time. Such a record will appeal to the man who has felt that ownership of an airplane is prohibitive, for the cost is only about 3 cents per mile above the cost of an inexpensive automobile.

Not only will private owners feel interested in such a plane, but flying clubs such as are so popular in England will spring up in America. A small group can afford to own a light plane; they can afford to operate it and enjoy all of the advantages which we provided the user who would turn to us as an acceptable answer.

In specifying the Whittemore Avian we will follow the Avian in detail. The Avian will have a span of 26 ft. when spread and 54 folded. It will have a maximum speed of 102 m.p.h. and 1,600 loaded. It will have a maximum climb of 102 ft. and 1,600 loaded. It will have a maximum range of 102 m.p.h. and a landing speed of 35 m.p.h. It will have a ceiling of 18,000 ft. and a crossing range of approximately five hours.

In considering the performance the low operation cost and maintenance and the excellent inherent qualities of the Avian design, we believe that production of the plane will grow amazingly coincident with the demand which will certainly evolve from appreciation of the model.

H. N. WHITTELSEY
President

Aircraft Products Corporation of America

IN ORDER TO serve a large number of the leading aircraft manufacturers, we have found a very delicate need for feed-back information of such parts that do not affect the individual function of a given airplane design. All would benefit by the awareness of manufacturers, obtained through the use of a standard part, which would enable the parts builder to eliminate excessive set-ups and secure larger production runs.

Our experience in the manufacture of "Off-the-shelf" parts has indicated that end fittings for structural metal should themselves very readily to stock a standardized program. It has been found that fundamentally all such fittings, together with the universal and oval ones, in a series design, staying only as to dimension and in some cases, that variation is only 1/8 in. We have already approached a number of our users and found them quite willing to co-operate with us in such a program, in that at the present time several manufacturers are using our standard fittings.

This is only one of the many instances that might be cited. A general program of standardization which

would reduce production costs would result in a surprising reduction in the final cost of the airplane. At the present time, each manufacturer is making many early special parts in small quantities in his own shop, which bear very close resemblance to similar parts being made in the plants of other manufacturers. If these various parts could be standardized and made by the parts builder in the increased volume which would result from such a program, they could be purchased by the airplane manufacturer at a very considerable savings.

Ralph P. Daniels
President

The Pyle-National Co.

THIS WEEK at the All-American Aircraft Show we are featuring a new type of field boundary case light and fixture. This lighting fixture is a standard vapor-proof fitting with a glass of clear, green, or ruby glass as specified. The case is 28 in. high and 35 in. in diameter. A 14 in. vapor diffusion plated reflector furnishes the direct light on the case. With this type of boundary light a landing field is sharply outlined both day and night. The size, shape, and color of the fixture make it stand out also during the daylight hours, while the reflector and the diffusing of the illumination of the case at night assures that it will be clearly visible, offering good protection to the location and height of the boundary light fixtures above the ground. The reflector also presents the direct light from reaching the eyes of persons who are passing their planes.

We have received many favorable reports from the various airports concerning on this type of fixture, particularly due to the added illumination given the case at night and, secondly, for the reason that with such one of these boundary light fixtures we may use a junction box for the underground cable recessed above the ground, which is much more accessible for repairs than the underground type. Besides the boundary light fixture, we are also featuring several "antique," or racing lights for planes and wing landing lights. These landing lights and running lights are now being used by a number of aircraft manufacturers. In fact, at the show, our landing lights in the retractable, bolting and attached form may be seen on from six to eight planes.

Ed. Sipp
John Sipp, Vice President

W. J. Savage Co., Inc.

WE ARE GLAD to be in the Show and to have the opportunity to exhibit and talk about the New Series GRAY METAL CUTTER. This cutter, or miller, is really as essential to the shop cutting or using sheet metal shapes as the hand saw is to the wood working shop.

We are truly to admit that the previous model did not always perform on the job as well as it did in our shop as test. Sometimes this was not the fault of the

machine—it was something new—the operating art was never—a great deal of the trouble was due to improper operation and overloading. However, actual details of the working head have been perfected to reduce vibration to the minimum, the tool holding device and tool bar has been improved so as to lessen proper holding of the tool so neither heat tough the steel at alloy being cut, tools have been made to determine the proper hardness of the cutting tool and die.

The use of the machine is varied, but its main purpose is to eliminate hand cutting or drilling out of shapes or designs is fast, sick, and to permit the duplication of designs, sample or service, by the use of a template. In other words, that GRAY METAL CUTTER will cut out the design or template to a verifiable line, and then cut as many duplicates of the template as are required. A machine which will do this is certainly a valuable tool to the aircraft industry as the latter is growing so great.

We are showing the New Series GRAY METAL CUTTER at the All-American Aircraft Show because the aircraft builders are using it and have use for it, and also because the new management of the Savage Company wants to meet these users and prospective users and show them what has been done to eliminate operating trouble.

H. Olson
President and General Manager.

Travel Air Company

TO WHICH AIR SHOW we are Travel Air planes has been a matter of intensive study on the part of our entire organization. Surveys have been made by our Sales Department is various sections of the country to determine what classes of business men are most interested in the purchase of airplanes at this time and the sales arguments of those who are most efficient to use.

These surveys have clearly established the fact that an active and immediate interest in airplanes exists in every business organization of size where the saving of time is an important factor in the conduct of its business. This means that those employing "High-type" between fully realize that the saving of a salesman's time is necessary to meet the business necessities of today. The logic which equally applies to the leading executives of the sagacious corporations and business organizations of the country.

Travel Air planes have held up for many business purposes, including the use of oil field executives and operators, owners of department stores, chains, and stock and bond companies whose interests travel over comparatively wide areas of territory. The airplane industry, however, is not yet old enough to be able to clearly classify the sales outlets upon whom most of the selling efforts could be centered with the desire of the greatest success. The answer in this respect lies in the fact that officials of practically every business institution are thinking about the use of an airplane in connection with business, but that these institutions, for one reason or another, wait before they buy, re-shape



The J-6 powered
Bellanca CH monoplane

Right: A
Salmon-powered
Aeronca
Klemm
monoplane



Left: The LeBlond engined Darling NBS



Right: Three-engined (Vultee)
Krebs Air Coach



Below: A Doyle "Orbit"
With a LeBlond engine



seling and organization policies in line with the greater territory that can be covered in a sales and merchandising way by a larger number of employees.

As a result, a lot of Travel Air Jet shot the airplane market at this time must be considered as a whole, and that prospectus must be bought out from every line of business rather than the marketing of sales activities upon one or more specific lines of business. The problem is the drag net kind of searching out the line prospect and then going through the various selling areas and activities that are necessary to bring him to the point of purchase. We mean by this that key business institutions are able as a matter of policy and orderly procedure to reach a decision over right as to the purchase of an airplane. This decision is a process of evolution and development in the mind of the company officials as a whole. The psychology seems to be just this. That one or more of the officials becomes interested, refines the need of an airplane to save time and better road competition, and then a step at a time starts to sell these in his partnerships who have a voice in making the decision.

In another year, Travel Air believes that it will be able to analyze the market by classes of business to such an accurate degree that for the 1939 selling season it will be possible to concentrate upon a field alone or in leading lines of business, at the same time necessarily working to bring other lines of business to the same favorable attitude. The merchandising of an airplane to a customer is akin to the selling of an automobile for travel purposes. The airplane is usually a certified automobile with the day for its travel set in traffic signals or road roads to inscribe its flight. As a result, the successful airplane salesman of today makes a study in advance of the prospective customer's actual business conditions, the extent of his competition, the size of territory he covers, the number of stations he travels, the miles per year that the executive should be in the field on general inspection and business tours and countless other problems. The salesman thus equipped with the facts surrounding the condition of his prospective purchaser is able to talk convincingly in terms of actual profit to the customer through selling of time.

H.W. Harrington

Wilson Steel Products Co.

We have numerous, BUT INTERESTING for the future of the industry, new developments, among which is the Aircraft Control, with which we have had considerable success. We have secured its adoption by many of the largest manufacturers of planes and feel all of our users are enthusiastic backers.

The thing that strikes us most favorably about our dealings with the aviation industry is the high type of men we meet, and the courteous treatment we receive from everyone with whom we come in contact.

J. C. Paulander

Douglas Aero Corp.

Timewise the 25 years of airplane development all mention has been centered on the mechanical construction and aero-dynamic research in three applications to air machines.

Well defined principles have been evolved from this particular work with the resulting success shown on every hand, and now mention is more or less suddenly being thrust in the merchandising and control of these new creations, which brings me to the greatest problem confronting aeronautics at present—the legislature and commercial exploitation.

The United States Department of Commerce has taken great care to go slow with legislative measures, always working with experts active in this particular field and prolonging rules and regulations as developments required so the Department is to be congratulated on the sound progress made in this work.

Regrettably this is not the case with many states where the new child of the air, now so much in the public light, is subject to ridiculous burdens and hindrances that will prove unbearable. The recent proposed legislation of Maryland is just one example of heedless lawmaking without fundamental knowledge of the needs of the particular subject in hand. Let each and every one of us, first our wealth and experience in assisting to forestall hasty unnecessary legislation.

On the other hand, a more strict enforcement and clearing up of present operations under existing laws is very desirable. This will call for a greater safety and increase in personnel at the Department of Commerce as well as the Aviation Department of states where laws are enacted but will surely wipe out a bad situation which is existing in many localities at the present time.

Schools have been formed very often by enthusiastic pilots of experience for lacking the business understanding necessary to grasp the liabilities imposed by legislation partly to forestall the loss of human lives. Schools enrolling students without having first passed a satisfactory physical examination are operating on a sound basis and should be dealt with in a strict manner because at the beginning is where trouble should be located—not after a crash. A frank listing of these facts is desired.

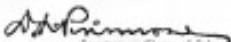
The most critical angle is the other problem confronting the aviation of tomorrow and the outstanding factor is that it is soon disappearing methods. The demand so far has been so limited that unorganized, non-commercial plane manufacturers had to pay very little attention to this side of the question or business, and this by simply concentrating only in an enforcement or school a potential manufacturer. There are a few notable exceptions to this by companies who have faced the problem and installed a distribution organization similar to that used by assembly-line manufacturers.

The small manufacturer, up to this time, has been able to sell his output by what amounts to plain day-long direct selling although he is prone to consider some of his sales on a distributor's basis giving discounts on one or possibly two machines that are not legitimately carried by the purchaser as in most of these cases he is a user who is willing to sell if the opportunity arises. This class of purchaser-distributor is not in a position to give the service that is required or should be expected by the average plane owner and will lead to should

distribution for the manufacturing company that follows this plan.

A real horde-like distribution should be required to work on all aircraft built applying a broad and wider distribution geographically so that his organization can supply the greatest number of planes during the shortest period. An incentive to go after business is made this way and will stimulate the organization into a real active one. This will also allow the manufacturer to place spare parts of a sensible manner for the star of the division undertaken by the distributor and thus eliminate unpleasant delays in repairing and refitting customer's planes.

More attention to the sales end of the business is being required daily and the manufacturer who builds up this end of his organization to be on an sound basis in his mechanical end, will be the one to survive the shutdown period which the industry is fast approaching.


W. R. Robbie
Secretary in Charge of Sales

Swift Aircraft Corp.

THE SWIFT AIRCRAFT CORP. is exhibiting three planes at the Detroit Show. Two of these are two place sport biplanes, finished in the three tone effect of black, red, and paprika cream. This makes an singularly pleasing appearance and is a new development in aircraft design.

The plane exhibited on the floor is powered with a Kinner engine, and thousand 130 h.p. air speed induction on the test flight. It is equipped with dual controls, upholstered in black and paprika, has a large convertible front seat for the passenger, owner, or pilot, with arm rest and is upholstered in genuine paprika leather. The rear of the sport plane has ample room, and are designed that either a seat cushion or a seat type parachute may be used.

The other sport plane is powered with the Wright H-150 h.p., 5 cylinder engine, and is at the Park Airport for demonstrations for all those who are interested. It is equipped with dual controls, instruments in both cockpit and wheel brakes. Extra equipment consists of a stirrup and horn, and bank indicator also other instruments being furnished as standard equipment. A large ample baggage compartment of weather proof construction is in the rear of the pilot's cockpit. A tool compartment is built in front of the front cockpit. This plane is also finished in a three tone combination of black, red and paprika.

The third sport plane is a single place plane, it is entirely by nature of a large double decker monoplane. All doors are hinged on center pivots. The luggage compartment of the sport plane can also be entered through a panel back of the pilot's cockpit. Both doors carry a key lock.

The stress analysis have been completed by H. S. Weilandter, consulting engineer of Dayton Ohio and have been forwarded to the Department of Commerce through the Washington representative of the Swift Company, C. L. Gleasons. It is expected that due to the thoroughness of the preparation of this stress analysis there will be little delay encountered in obtaining an Approved Type Certificate. In fact, the Swift Company are going ahead with production at the rate of one sport plane per week.

In addition to these two sport planes, the Swift Aircraft Corp. is also containing a recently developed semi-sport type of training plane. This is also a two place job, and can be powered with either engines from 30-35 up to and including the Kinner and Warner 110 hp. engine.

The writer and W. R. Robbie, president of the company, will be in charge of the exhibit.

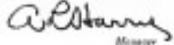

R. J. Edwards
General Manager

Kelton-Aurand Manufacturing Co.

WE ARE MAKERS of loads of transportation seating equipment and have been selling to a number of airplane manufacturers throughout the country at the Detroit Show, consisting of several types of seats.

While we are, no doubt, a slight producer of seating equipment for airplanes, the whole proposition is still a young one and there are no many problems that must be solved by the seating equipment engineers and the airplane designing engineers that radical changes will no doubt be made in the present style of seats. Our company has made and is still making an exhaustive study of the requirements of the cabin plane manufacturers, as far as seats are concerned, and we believe we will be greatly benefited by the possibility of convening with so many airplane producers at the Detroit Show.

The plane exhibited on the floor is powered with a Kinner engine, and thousand 130 h.p. air speed induction on the test flight. It is equipped with dual controls, upholstered in black and paprika, has a large convertible front seat for the passenger, owner, or pilot, with arm rest and is upholstered in genuine paprika leather. The rear of the sport plane has ample room, and are designed that either a seat cushion or a seat type parachute may be used.


Al Hartney
Manager

Continental Motors Corp.

THE PAST TWO YEARS have witnessed tremendous advances in aircraft design. This has been made possible by new engines developed to meet the increased demand. Set to quickly has the industry developed and so great has been the demand for engines, that the supply of available power plants has not been sufficient. Many aircraft manufacturers have been unable to lay out progressive programs because of the inability to obtain engine equipment. The increase in business has brought into many of the wartime engines and the whole result has been that many aircraft manufacturers have five or six different engines which they are prepared to furnish.

The difficulty of engine for an aircraft engine is entirely by nature of a large number of aircraft models. All doors are hinged on center pivots. The luggage compartment of the sport plane can also be entered through a panel back of the pilot's cockpit. Both doors carry a key lock.

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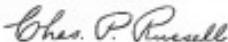
Another is passing through such the same phase of growth that witnessed the rise of the automobile industry. There are many companies engaged in building airplanes with varying capacities. Many of these organizations, as was the case in the automotive field, will pass out of the production picture. It will be the "survival of the fittest" and those builders who look towards

standardizing their products and employ progressive methods of manufacture will be the dominant factors in this new industry.

The principal point of standardization will be the power plant. Instead of offering a number of different engines with varying characteristics, it will be found more advisable to select an engine which when associated with the plane designs will give the best results in speed, loading and economy. It will then be a question of setting up a performance and price basis. For manufacturers who build two or more different sizes in planes, the economy in obtaining supplies from one source with the interchangeability of parts that would be available on different size engines, this would be very great.

Continental Motors Corporation is in a position to assist this standardization program in a very material way. The first engine to be produced is a seven cylinder model in the 130 hp. classification. This is an addition to the All-American Aircraft Show in Detroit. Other engines will be offered later in larger and smaller sizes so that soon a complete line will be available to satisfy the power requirements of all manufacturers. The production program will be on a scale which will provide ample quantities of these engines to protect the most progressive aircraft building schedules.

The facilities for research available in the Continental organization will be constantly employed to insure the most up-to-date designs. In this manner Continental will make its contribution to aviation and assist in making this new industry a force in the business world.


Chas. P. Russell
Manager, Aeronautical Sales Division

DeWalt Products Co.

A MACERATOR CUTTER of considerable interest, which is being shown at the All-American Aircraft Show, is the Model 5-62 flying scat metal cutting saw developed by the DeWalt Products Corporation, Lodi, Pennsylvania, known as the DeWalt "Wonder Metal Worker" for cutting stainless steel tubing and flat stock. Great advancements have been made in production methods within recent years and the DeWalt "Wonder Metal Worker" has had a great deal to do with that increased efficiency.

In cutting stainless steel tubing and flat stock, before the development of the DeWalt metal cutter, the was a tedious job by hand saw or other methods. Now the cuts can be made in a fraction of the time formerly required and all angle cuts are made simultaneously as well as cuts in flat stock.

The DeWalt "Wonder Metal Worker" is a 5 hp overhead, direct drive circular metal cutting saw which is adjustable to any angle cutting and will handle tubing up to 3 in. in diameter, 1 in. wall thickness, making a clean, square cut.

The saw is used in a 12 in. hollow ground, metal cutting saw which has surprisingly long life. In cutting 1/8 in. stainless steel tubing, the average life is from 4 to 5 days before resharpening, when it is touched up with an ordinary hand file. Eight to ten days is the usual service on low carbon steel before resharpening. But even regular feeding of the saw through the material,

a smooth switch feed is provided on the arm of the machine. This produces a smooth cut for clean parting.

For holding the work, as on pipe wise, developed by the engineers of the Travel Air Manufacturing Company, Wichita, Kansas, which firmly grasps and feeds the tubing the desired length, is available with the DeWalt, which operates from 20 to 150 lb. air pressure. The jaws of the vice are adjustable to handle tubing up to 3 in. in diameter. It is a speedy and simple in operation and it is recommended whenever tubing cutting is done on a production basis.

Over 80 pieces of the planes exhibited at the All-American Show this year have been manufactured by the use of the DeWalt "Wonder Metal Worker." These owners include the largest manufacturers in the field as well as a number of taking manufacturers, who use it in their production.

The DeWalt "Wonder Metal Worker" is recommended wherever there is any cutting to be done in stainless or welded tubing and flat sheet stock, as the machine can be used very rapidly on production work where a smooth rapid cut is required. The DeWalt "Wonder Metal Worker" occupies a space of 26 sq. ft. and does not cost more than 30 cents per day for operation.

PAUL GARDNER
President

American Aeronautical Corp.

OUR COMPANY, which has started the business to manufacture the well-known Stinson Martenber Flying boats and amphibians in North America, is exhibiting one of the newest 5-62 flying scat at the Detroit show. This machine has a high speed of 23 mph., a cruising speed of 18 mph. and a landing speed of 52 mph. with a 2,000 ft. take-off run, a service ceiling of 13,270 ft. The boat will float to a 60 ft. x 7 ft. 2 in. 25 sec. and to 843 ft. in 25 sec. This remarkable performance, which is obtained with the usual 500-750 lb. power plant, may be attributed to the high aerodynamic efficiency of the wing section that is used and to the great attention that has been paid to the hydrodynamic lines of the hull.

The 5-62 has been developed as a fast and powerful transport, which can be used commercially or privately, for either passengers or mail. The maximum disposable load is 1,000 lb., although the plane has lifted as much as 4,000 lb. for rescue purposes. There are cabin accommodations for seven persons, and two bathies are provided for use in getting in and out. The pilot and mechanic or the extra passenger are seated in the forward part of the cabin, while the other four persons that the plane will carry are seated in the rear. By this arrangement there is no difficulty in commanding with one another. Also, exceptional visibility is provided for all. Another feature is that the boat can be transferred into an amphibian very easily with the installation of a special retractable landing gear by the company.

Cover water flying is something that has not been developed in the United States as much as a might have been. In fact, there are very few organizations of flying boats and amphibians in a result of the trend that the industry has taken. There is a definite field for the water craft, however, and the American Aeronautical Corp. is well prepared to meet the demand.

Right: The twin-engined
(Wasp) Sikorsky S-38
"Amphibian"



Left: The Eastman
flying boat with
a Siemens engine



Right: A "Wasp"
powered Loening
cabin amphibian



Left: A "Wasp"-engined
Vought "Corsair" with
amphibian landing gear



Sikorsky Corp. is bringing the Savoia Marchetti line to this country to aid in developing that field. The S-62 on display this week in Detroit is the forerunner, so far as America is concerned, of the Savoia Marchetti boats and amphibians to be manufactured in this country. Savoia Marchetti machines have been known for the last 12 yrs. Over 2,000 of them have been built abroad, and all have established records for efficiency, which have proven themselves in their classes. The record flights made by such well-known pilots as Maresco de Poedro and Arturo Ferrara are merely samples of what has been done in Europe with these planes. It is safe to assume that equally great records will be set by the American Savoia Marchetti flying boats and amphibians as the future.

Stewart Hartshorn Co.

In the year 1917, when our country entered the World War, there was a demand for stratosphere wires. There was no existing specification concerning such a product as this country, and the Government had made extensive plans for the production of airplanes, which, if equipped with stratosphere wires, would result in far more efficient performance. The Stewart Hartshorn Company had produced an extremely high grade strand wire for many years and the facilities at its plant were found ideal for the production of the wire. After extensive tests had been made, the company developed stratosphere wires which were then met the most exacting requirements laid down by the United States Government.

Hartshorn Stratosphere Wires are drawn and cold rolled from the best quality of electric furnace carbon rod obtainable and by special heat-treating processes a wire of high tensile strength and excellent elasticity is obtained. Hartshorn Stratosphere Wires are produced by the cold reverse rolling method which the company has succeeded in developing with a high degree of perfection. No experiments will be undertaken to undermine both for its own satisfaction and an behalf of the United States Government (for whom it was under contract for a considerable number of these wires) and, as a result of its experiments, the Hartshorn company is producing stratosphere wires which exceed than withstand the hard usage to which they are subjected. The cold reverse method produces a wire is every way superior to that made by any other process yet devised and, obtaining a wire of a certain size by several passes through a rolling mill, as a direct benefit results in a saving in cost, which result in savings when storage and further processes are used. Very extensive tests and other photo by representatives of the United States Army and Navy to determine the quality of the products and the Hartshorn company will, upon request, be glad to furnish very detailed information upon this subject. Stratosphere wires in coils as opposed to the use of cable housing, offer very much less surface to the wind, enabling the plane to gain a much higher speed, which in turn must mean for the manufacturer a much increased profit.

Appreciating the demand for a satisfactory internal rod, the Stewart Hartshorn Company, during the year 1938, developed a square section internal rod which supplants the old round type and has been adopted as standard by the Army and Navy. These rods are pro-

duced by a special method derived by its engineers and yield a product of excellent quality. This type of rod is strongly subsectioned for all internal fastening and housing housing.

All Hartshorn Tu-Rods are subjected to manufacture to frequent tensile samples taken from every coil of wire to insure that the properties called for are being maintained and the same high tensile and ductile properties found in the stratosphere wires in the spans intended to test. The company fully realizes the same conditions which the rods must meet and their aim is to produce a wire which will not only meet the regular specifications but one that will also prove even and dependable in manufacture. Hartshorn Tu-Rods are made with cut threads held to a very close tolerance as precise threading is a most important factor in the safety of the wire. All wires manufactured are subjected to a series of test and inspection to go over each of their specified breaking load abilities having the Stewart Hartshorn Company's plant.

Practically all designers of aircraft find it necessary to have their ships work the rods either externally or internally, and, in most cases, bush types are used. The square section external type of rod is used for housing wires and fastening externally. When flying, landing and airplane bracing are required, the stratosphere section is employed. Landing gear and tail surfaces are likewise braced with stratosphere. Few other aircraft manufacturers afford a more general use throughout aircraft.

At the All-American Aircraft Show in Detroit, the Stewart Hartshorn Co. is exhibiting a full line of internal and external Tu-Rod housings, along with specimens of raw material and material in process indicating the physical properties of their rods.

Huskite Manufacturing Corp.

DIRECTORIAL, is undoubtedly one most interesting and useful outlet. This is particularly true where the large manufacturer is concerned. By this method we obtain personal contact with the buyer, and his needs or problems can be brought directly to us. Individuals and some of the smaller concerns are handled by our public relations department especially staff in some locations.

The aircraft show has unusual educational value. It is of value to the exhibitor, the manufacturer and engineer, and the public. Aircraft shows give the exhibitor a unique opportunity to display and advertise his product to those who are most interested in it. It is here that the manufacturer, designer, and engineer meet. The exhibitor obtains personal contact with those men he can directly discuss their problems and requirements.

The manufacturer, engineer, and designer benefit in much the same way. They can make direct comparison between products, and select that which best suits their needs. They can bring their problems directly to the supplier who is in exhibition and have an opportunity to see the new features and developments shown.

Last, but not least, the aircraft shows are of great benefit to the general public. It is the only place where

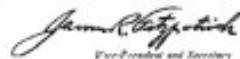
it can use the raw materials and finished product together. The public travels and buys surfaces, uses them for freight and mail, and may even stock in aircraft companies. Eventually the problem of selling anything reduces itself to the education of the public, and it is in the aircraft show that the public can best learn about aircraft and its manufacturers. Aircraft shows are milestones of progress. It is here that new features are most advantageously exhibited.

Perhaps the biggest problems confronting the development of airmen at this time are the delivery of engines, the training of pilots, the creation of laws governing the manufacturing and piloting of planes, comfort, and safety.

This last is the most important. Rapid progress is being made in night flying, the development of airmen and commercial flying. We lead the world in airmen, but despite this fact, air disasters are news; the greatest accidents receive the front page. It is imperative, therefore, that flying be made absolutely safe.

One of the features of our exhibit and industries panel, "The Aviation of Tomorrow," was never more graphically demonstrated than in this. Commercial places provide for protection against the wind, but at the present time they do not furnish sufficient insulation against sound and cold. The Hudson Manufacturing Corp. is endeavoring to produce a seat, light panel having excellent insulating qualities. In addition, we are showing Hudson, Pynear, American Plymet, Duralumin, Phenol, Ballo Plywood, and different sections of wing ribs, covering edges, dusk boards, instrument boards, floors, etc., which our engineers will furnish us for calculating purposes. A special display of wing beam working in spruce and mahogany is being shown, also panels in thicknesses of $\frac{1}{2}$ " and $\frac{3}{4}$ ".

The Company is being represented by C. E. Scott, sales engineer, G. M. Hannikas, sales engineer, and the writer.



James H. Mahoney
President and Secretary

Mahoney-Ryan Aircraft Corp.

We ARE PROGRESSIVELY shown how we find products for airplanes. During the past year, in which nearly every manufacturer enjoyed more business than his production could take care of, the question was easily answered. In other words, products did not have to be brought—they appeared with money to hand and delivered by delivery men. By the great majority of sales went to commercial operators who were interested in low plane sales solely for raising profit directly. Every operator of a war-airplane ("Jenny" or early type open plane) saw the possibilities of profit in offering the public a ride in the new type closed cabin plane.

The task of renewing the aircraft market was not a difficult one when the profits of pilot barnstorming in low and open plane cabin planes and even in-suites became known about the country.

For the coming year, however, the aeronautical industry seems fairly well agreed that new markets must be sought and demand created among corporations and

individuals in order to consume the products for which they are preparing.

During the past year flying has been found to be commercially profitable for many business organizations, most prominent of which are probably the oil companies. However, other large corporations and individuals with widely varying interests which take their own considerable territory are finding the plane not only a great convenience but almost a necessity. Flying has been made steadily popular through the introduction of American Country Clubs and the adoption of the air yacht by people of means, as a companion to water-craft.

Early in the year the Mahoney-Ryan Aircraft Corporation decided to determine for itself just what current manufacturers, officials of large corporations, railroads, etc., had in aeronautical development. Accordingly a mailing campaign was commenced and results obtained were comparable to the most successful of general mailings. It was, of course, impossible to determine in advance whether or not a letter from an airmen contact would actually reach the desk of a business executive. Apparently a letter from such a company was sufficiently unusual to get it by the first line of defense, and replies were received in the present handwriting of some of the country's ablest business men.

The campaign was designed, not as a salesmen selling talk, but as a plan to increase air-mindedness among American business executives. Business reply cards were enclosed to facilitate the reply of the prospect and the quantities in which these came back was surprising, look to the postal authorities and ourselves. The object of the reply card was to assure one of the new catalogs of Ryan planes which had been designed along the lines of the most elaborate aeronautical models. The plane was treated partly as a source, dependable means of speedy transportation. Illustrations of the interior were intended to convey the feeling of comfort and implied safety through the luxury of appointments and taste in design. The plane was shown as an accessory to business and a new adjunct to sport and aviation. Adaptation to seaplane and the seaplane was suggested and finally, by means of graphic sketches, the performance of the plane itself was shown. The whole attractiveness of the catalog was used to insure confidence through the conviction that the new methods of transportation such as the automobile and yacht. Due regard was given to the simplicity of operation and ease with which the private owner might himself tune up the engine and the necessary overhaul data and specifications were indicated in a few pages at the back of the book.

We feel that with this initial step and with the general campaign of mailing for the future, that we are leading a new and undeviated market. The commercial market, meanwhile, is, at present, not being exploited by any means. The Mahoney-Ryan Aircraft Corporation has approximately 35 distributors in this country and half a dozen more in foreign countries and these are constantly being contacted and assisted by a group of field men who are demonstrating new planes and following up the prospects in existing districts.

Concentration of production on one particular model has always been one of the first principles of the Mahoney-Ryan organization and the six-place dual-control Brougham with 300 hp. Whirlwind engine, exhibited for the first time at the Detroit Show is now due, in standard production for the year.

Our sales plan does not attempt to compete with that of manufacturers of large transport planes, nor yet of small open sport planes. It is our desire, however, that there is a very definite market for planes of the brougham type in the smaller towns and in territories too remote for the carrying of passengers. It is also a practical plane for manufacturers who do not care to be burdened with the great overhead of the transport plane and have a maximum of operation economy.

The aircraft market is undoubtedly going to become more intensely classified according to the carrying capacity than has the automobile market, and the Mahoney-Ryan Aircraft Corporation feels that its place is definitely in the medium-sized single engine field.



W. A. Stockworth
Assistant Sales Manager

Ex-Cell-O Tool & Manufacturing Co.

We're in a new to the leaders in the air. I take this opportunity to "point with pride" to Ex-Cell-O's relationship to the overall industry. Ex-Cell-O is now making precision small parts for 17 different manufacturers of seaplanes and surface engines. Included in this list are found most of the leaders of the industry to whom we supply such precision parts as valve guides, valve tapered guides, cam and rocker arm rollers, piston pins, valve tips, connecting rod bolts and propeller hub bolts and all types of precision allied thread studs.

Ex-Cell-O has always been a precision shop, working to close limits. As airplane work is held to particularly exacting specifications with extremely close manufacturing tolerances, the engine manufacturers immediately looked for some source, already equipped and trained in that line of work, to produce the small parts for them. From the start we have been in evidence. Our business men are of the opinion that these manufacturers have no regard for the choice of Ex-Cell-O.



W. A. Stockworth
President

American Cirrus Engines, Inc.

THE HERITAGE of the American Cirrus Engines, Inc., at the Detroit aircraft show is illustrated in the new American Cirrus engine and the world's records made by that aircraft in which Cirrus engines have been installed. The three main advantages of the American Cirrus engine are also being stressed. These are first, its simplicity of construction; secondly, its well-known reliability, and third, as "one-line" design.

In the designing of the Cirrus engine, it was decided that it was most important to keep to a form of construction that would create and retain the confidence of the private owner. Therefore, a design was chosen with which the average man was familiar, namely that of the less expensive engine. Cylinder heads are recessed into the cylinder and cylinders are likewise recessed into

the crankcase, points of the cylinders and heads being sealed by gaskets. The complete cylinder-head assembly is held in place by the combination of four steel plates projecting from the crankcase and passing through holes in the cylinder head. This simple construction allows the heads and cylinders to be easily removed without taking down the engine. The joint simplicity is followed throughout construction. In other words, the engine has the advantage that it requires no greater skill for its maintenance than an ordinary automobile engine.

The second advantage of the engine is in its intrinsic reliability. Its records in performance are known the world over. From England to Australia, England to South Africa, around the coastlines of Africa, back and forth across the United States, Cirrus engines have been flown in long distance flights. They are used extensively from the wildernesses of Northern Canada to the southern tip of South America, in England, France, Italy, India, Egypt, Persia, China, Japan and Australia. Flying in these countries in the extremes of temperature and adverse weather conditions, they are continuously doing their work with reliability.

The third advantage of the Cirrus is, that owing to its fine design, and to be maintained in the course of very light planes with greater forward visibility and without any loss of engine weight. This advantage meant a fast deal to the private pilot and sportsperson pilot. The second sales outlet for the American Cirrus engine are the light aircraft manufacturing companies, operating companies using light aircraft, flying clubs, individual pilots and sportspersons. There are three main factors that have a direct bearing upon these outlets. They are first, the growing popularity of general and sport flying, second, the great need for training and sport planes; and third, the availability of the Cirrus engine as a medium of securing greater forward visibility and speed.

Private and sport flying is fast taking a great hold in the United States. Flying schools and clubs and aviation country clubs are being formed the country over, and they are abounding to their membership hundreds of persons who are desirous of learning to fly with the intention of buying their own little shop for pleasure and transportation. These people are not entering the field of aviation with the intention of making a business. They are those who will sell aircraft to purchase and maintain them for their personal enjoyment. They also will buy light planes in a census of personal transportation because of the advantages of speed and comfort. In addition, small training planes will be needed badly in the near future. Up until this time, there have been practically no engines built for private and sport flying and the Cirrus engine supplies a power plant that is ideally suited for training purposes.

ALLAN C. HOFFMAN
Vice-President

The Austin Company

AS YOU RECENTLY saw at the Detroit aircraft show, we are exhibiting a lighted model of a modern airport, samples of airport surveys and reports, catalog, photographs of airport hangars, terminals, etc., which have been designed, built and equipped by the Austin Company as architects, engineers, and builders of airports. Five members of the staff are representing our company at



Left: A Whitehead-powered Cessa monoplane

Right: The Laird biplane with a Whirlwind engine



Left: The Whirlwind-powered Leibhold biplane

Right: An OX-5 Kestrel-Bessier "Challenge"



Left: A Leibhold-powered Arme Sport biplane



the show. These are W. J. Amlin, president; G. A. Bryant, Jr., vice-president and general sales manager; A. F. Price, Detroit district manager; J. C. Proctor, assistant manager of the Airport Division; and W. E. Arthur, manager of the Airport Division.

The Moto-Meter Co.

WITH THE AIRPLANE INDUSTRY now on the threshold of becoming one of the greatest of modern achievements in transportation, the manufacturer and operator are now faced with the problem of creating a public market for their products and services. Creation of this market is essential before the industry can assume the task predicted for it by those who look ahead.

Purchase of airplanes in the past few years has, in number, been far below the demand. Potential operators have had to wait weeks and months for planes before they could start their lines. What service they were able to provide was readily used and the market seemed to grow every day.

Paid with this increasing demand for more and more planes, the manufacturers naturally restricted expansion programs. Some of them are so large as to cause apprehension when the future is considered along with the rapidly changing form of change.

During 1928 there were approximately 5,000 plane turned out. Production schedules for the present year forecast more than double that number.

This increased production has enabled owners of operators to complete their equipment and start services which, during this season, will cover the United States with a network of passenger mail and express lines. It is seen, as many of the cities which are well covered, there was a limit to the present day demand for service. From a public relations position it is fitting that it is making no first effort in the production of air that they are aware that they must give attention to airshowing as well as plane building.

It is apparent that the airplane has not quite been removed from the spectator to the usual commercial in the public view. The tremendous interest created by the power and daring aerial flights still remains, but it is a slow process in converting it into a realization that airplanes offer service to the ordinary layman as well as the wealthy sportsmen.

Such a condition brings in the industry for the first time the problem of selling its wares. If all the planes built this year are to be sold there must be people willing to take advantage of the mail, passenger and express service that will provide. Of course not all manufacturers and operators are confronted with this problem. Many of the major concerns are still behind in orders and active service because of consciousness. It is generally conceded that the market needed will not come from the man able to buy his own plane but from the man in the street, the man who still looks to the sky when he hears the roar of an engine overhead.

Mail and express are the only classes of service now within his province. Passenger fares will eventually be cut so that this medium of travel will also become popular. One of the most important methods for carrying the aircraft message to the public is the aerial show. In one of these exhibitions, the man who will supply the future market for service is able to give the

airplane class inspection, see how it operates, and is informed of the thorougn and one way the airplane will help him.

Promotion even more important is the opportunity an aircraft show gives to the future users of airplanes, the boys and girls of school age who are up to the minute in their knowledge of aircraft and who can ask questions that baffle the old timers right and left. They are the ones whose confidence will bring about Atlantic service and other such projects. As aircraft shows, such as the All-America is worth the effort.

The Moto-Meter exhibit is in the charge of Henry C. Blasius. Others attending are Roy P. Herley, chief engineer, and R. L. Carey.

George H. Townsend
President

AC Spark Plug Co.

There is no question that the progressive development of aviation, especially in the past two years, has been the outstanding achievement in the world's industry. And there is no doubt that aviation, year by year, will show such phenomenal gains that within five years, perhaps, the term "aviation industry," as applied to aviation, will cease to be. Aviation today has really passed its infant stage and is firmly engaged in the industry among some of the country's oldest, most conservative and most substantial concern and individuals. They would not be putting their capital and efforts into aviation unless they had the utmost confidence in it.

In the strictest sense, aviation is not just a new industry. It is a transportation business in a new form. It is fortunate in having all the experience and facilities of individuals and firms long engaged in the transportation field—the engine manufacturers, instrument and accessory makers, tire makers, body builders, etc.

Avgas has made an great headway largely due to these agencies and through the personal firms of publishers. Today many newspapers are carrying aviation columns and commentaries and the result is that the aviation editor and publishers have entered the aviation field. And any future history of the progress of aviation deserves a great big chapter devoted to the importance that has been done by editors and publishers in promoting aviation. Publishing for the aircraft industry has been responsible in a very great measure for the rapid strides of the aircraft industry.

Just as managers of the oil added gasoline to aviation achievement, manufacturers and engineers have also done their part in the development of new engines and other devices to keep ahead and even ahead of the industry's progress. The aerobatic and race engines engines were developed; navigation instruments perfected and every component part of the airplane improved.

The important part played by sport planes, for instance, was made possible by engineering development and the AC spark plug, selected by Charles Lindbergh, Bert Acosta, Stanislaus Sobek, Maxfield, Hogenberger and others were designed and developed long in advance of the special flights made by these great fliers. The engineers, continually seeking the ideal, had anticipated the needs of future engine requirements.

The AC company now is engaged largely in research work along aviation lines. Our staff of engineers can honestly say thirty-five technicians, is devoting a great deal of time to designing and developing aviation products. Today we are manufacturing ten aviation products as follows:

Spark plug, tachometers, ammeters, thermocouples, pressure gauges, air cleaners, aircraft batteries, alternators, oil speed indicators, gasoline timers and fuel pumps. As time goes on we are confident that aircraft will play an ever increasingly important part in the manufacturing activities of our company.

H. H. CURTICE

Our President and General Manager

E. S. Twining & Co.

THE COMPLETE LINE of "Plastics Fibers" manufactured by our company, packed sizes, and sealed reinforcing tapes in all sizes, and an "asphalt" manufactured from Plastics Fibers and similar to the one which Commander Edward E. Byrd took to the South Pole, are being featured at our display at the Detroit Show this week. John H. Twining and V. Blane, Jr., are in charge of the exhibit.

Aqua Oil Service, Inc.

IN view of the fact that Aqua Oil Service, Inc., manufactures field tank heating jets, some operators have pronounced the idea that the Aqua System is "just another heating system". Furthermore, there has been some idea that the company is chiefly concerned in passing over its jet heat.

As a matter of fact, the Aqua System, known technically as the Aqua Non-Hazardous Hydraulic Flotation System is, fundamentally, the underground storage system. The basic system includes storage tanks and piping to various outlets. Whether the actual process of floating planes is direct from jet heat, passed by portable truck or necessary to have large storage capacity preferably underground.

To dispose gasoline from an underground storage tank, there are two methods, namely, suction pump and Aqua Hydraulic Flotation Principle. As it is common knowledge that with the suction pump method a suction pipe with low value is inserted to a point near the bottom of the tank, that method will not be described in this article.

The Hydraulic Flotation Principle may be unfamiliar to some operators but it is the method of handling gasoline that has been used by a number of amateur operators, national oil tank heating and gasoline filling stations for many years. For laboratory and special test application it has proved most useful.

The Aqua Hydraulic Flotation System is a power operated system that will supply gasoline from one tank to any number of dispensing outlets and any speed of flow may be obtained. Fuel leaves the top of the tank

consequently the last gasoline to storage is always being delivered for service. There is no evaporation loss even when the most volatile liquids remain stored for a long period of time. As there is no evaporation at fuel in storage there are no fumes in the storage tank, the storage tank can never explode and, of course, there is no danger of hazardous fumes when storage tank is being filled from tank wagons or tank cars.

With blended fuels, which have been increasing in popularity for several years, the situation need not give rise to stratification. If fuel is storage, afterburn and section pipe is at the bottom of the tank the heavier, lower grade fuel is automatically removed. As a result, and this is the benefit of floating jets, but very often, one obtains a lower grade of fuel than would be obtained from a straight refined high test product.

With the Aqua System stratification is reduced to an absolute minimum and probably prevented entirely due to the fact that the tank is "soil storage" with fluid under slight head. Many Aqua System tanks are equipped with floating header and it is a very simple operation to actually blend fuel in storage without removing it from the tank and without having it in contact with air.

The Aqua System operates with the most reliable source of power. The cost of operation is low, there is probably no cost of maintenance, storage tanks cannot be buried out of the ground by surface water and accurate check of all fuel in storage and handled over a long period of time may be measured.

Available at Detroit aircraft airport and Flying Field facilities, tanks, gasoline and oil tanks, field tank jet heat, gasoline and oil feed pots for oil, air and water, hot water control systems, for centralized generation and records, engine test fuel supply equipment, automatic control for control head, gasoline meter panel for wall panel mounting, predominance stop meter, and gasoline and oil piping.

Packard Electric Company

NOTWITHSTANDING THE TREMENDOUS PUBLIC INTEREST in though aerostatic and in spite of the record-breaking stunts at all of the principal aviation shows lately, I do not believe that even we, who like to believe we are more or less in and of this particular industry, fully appreciate the value of aircraft shows.

That they are of value, no one seems to doubt. The question is, how valuable and in what way?

Most of us quite naturally look at a question of this kind with a selfish background. We want to know what we individually get out of a show in the shape of new contracts, aerial tricks, trade prestige, etc. This is entirely correct. We have to measure the expense of time, energy and money and compare it with the value received to us in our own individual business.

But in doing this, we must take a broad gauged attitude. For the plane manufacturer, undoubtedly the show is the means of exciting customer interest in his particular product and is probably, except for personal demonstration, the most effective method available. It has been successfully used in the automobile business for years and while the nature, character and results of the

AVIATION

April 5, 1929

National Automobile Show has probably changed markedly from the early days, yet we still continue to hold them and the amount and attendance goes larger as the years go on.

But how about the parts and accessory manufacturers. Those of us who are interested in seeing the executive and engineering personnel of the plane manufacturers—our customers? Do we get value received?

It is strange to discuss our products with an engine manufacturer, we feel less interested in his own sales problems. The fact that he is at the show indicates that he is seeking further contact with his own customers. His sources will come to him, but he must in turn go to his customers. We find him wondering just what new contacts he can form and how he can interest his former relationships.

From the standpoint of aerialists, therefore, we also from a parts standpoint a certain amount of a net loss. This does not mean, however, in my opinion that we do not owe our full support to aviation shows. In fact, I believe that they are themselves quite important to our particular scheme of things.

At the Aircraft Shows we learn all of the going and comings which usually vitalizes the heart of a more or less competent technician of just what is going on.

We get a clear-cut view of what is going on in so far as rapidly changing technique. We learn who have the most appealing models and who are dangerous ahead most rapidly. We make certain contacts, which, when followed up aggressively, actually lead to business.

By all means, I think that every manufacturer whose products lend themselves to aviation application, should attend as exhibitor at all of the national aircraft shows—that has been and will continue to be our policy!

Sales Manager

The National Glider Association, Inc.

THE NATIONAL GLIDER ASSOCIATION, of which I have the honor to be president, is engaged in a strenuous effort to introduce motorless flight to the young men and women of the United States.

The National Glider Association, Inc., is making every effort to assist Americans, young and old, in a movement which is at once a clean, profitable and fascinating sport; an efficient, safe, motorless aircraft; a unique plane design and safety in aircraft construction and a means of developing and maintaining new aircraft designs.

The National Glider Association is affiliated with the National Aeromotive Association, and has the hearty support of that organization. We have authority to license third and second class glider pilots and to supersede the licensing of first-class glider pilots in the name of the N.A.A.

We are not attempting to rush the movement more rapidly than general knowledge of the subject permits. We have associated with us in the National Glider Association, some of the outstanding leaders of Aviation aviation. At the head of our Technical Committee, is Dr. Wolfgang Klemperer of the Goodyear-Zepplin Company, of Akron, Ohio, himself the first individual

to receive a license as a glider pilot in Germany. Associated with him on this very important committee are the heads of the Aeronautical Departments of the New York University, University of Michigan and the University of Detroit. Professor Horace Powell and Alfred L. Moore, on the Committee, is that veteran American pilot, Edward A. Stinson and the distinguished aeronautical engineer, Alfred V. Verdoorn and Capt. L. M. Woolson. Other members of the Board of Directors and Committees are of equal standing in aeronautical circles, which is a guarantee that we will progress along safe and sure lines in the development of that fascinating sport in this country.

Miss Annie Kartar, Maj. Reed G. Lands, Dr. Klemperer, Prof. Abrams, Earl Oberon and William J. Scarpelli of our Board of Directors, have all already participated in single gliding during the last few months. They are unanimous in their judgment that even the simplest form of gliding is a thrilling and interesting sport. What then may we expect when our pilots are able to get into advanced soaring and stay in the air for hours at a time, as did Peter Hirschfeld, German expert, on Cape Cod last summer?

It might be well at this time to call the attention of those who may read this statement that our greatest pilot gets his first experience in gliding in the simplest, rapidly moving aircraft, to the more advanced stages of the sport as soon as possible.

It is important to follow the movements of training.

All persons interested in gliders are invited to attend the National Glider Conference to be held during the All-American Aircraft Show, on Wednesday, April 10 to the afternoon the conference has been invited to join the session of the Aeromotive Section of the Society of Automotive Engineers, and at that time we will hear a lecture covering both the popular and technical phases of the sport from Dr. Klemperer, the outstanding authority on the subject in this country. Also, Miss Kartar and Major Lands will briefly outline the thrill which they received in gliding during the last few months. The interest shown by these meetings the conference will largely guide the Board of Directors in the preparation of plans for the summer of 1929. If you wish to see a more ambitious program carried through you should attend the conference and present your views. Everyone is welcome regardless of whether or not they are members of the N.G.A.

President

Johnson Airplane Supply Co.

PROBABLY NO MORE PRIMITIVE DEVICE exists in airplane design than the tail skid. Perhaps no other unit of the airplane is responsible for as much trouble and maintenance difficulties as a tail skid.

The advent of wheel skids affords an opportunity to eliminate the sliding, noisy and inefficient skid for the skid, rolling and more modern wheel, for in the period before man's wheel the sled served as a skid.

The use of a tail wheel solves wear and tear on aircraft as well as on the airplane structure itself, it eliminates



Left: The "Cardinal"
monoplane powered
with a Le-Boulé
engine



Right: An American
Glenn Mark III powered
Great Lakes training plane



Left: A Whitcomb
engined Lockheed "Vega"



Below: A Heenes
powered Alexander
Eaglemoss



Above: A Waco 10
powered with
a Conestee engine

saves the costly and time wasting replacement of tall skid shoes—der a swiveling wheel will not have a friction of the wear as on a fixed "shoe"; it permits economy in taking off and landing, it enables parking of the plane with minimum effort, and no dollar or special equipment.

But—to obtain the full benefits of a tall wheel it is tally essential to remember that the wheel shell must be suitable and the installation must be correctly made. We recommend the pneumatic wheel for its quiet and satisfactory performance; note on solid wheels have proved them noisy and uncomfortable to crew and passengers.

We learned in our own tests that the plain bearing could not stand up in these small wheels when used at such high speeds of revolution. Ball or roller bearings were more practical, and in our efforts to reduce maintenance difficulties, standard (not special) Timken bearings were used, as they carry load as well as solid load and are adjustable.

While the installation of a tall wheel involves no particular difficulties, it is well to arrange for restricted movement in testing, let 200 deg movement for parking, and also to have the center of rotation normal to the ground line.

One will note an increasing number of planes now dropping a tail wheel, and we believe it is only a short while before the airplane equipped with a tall wheel will be considered old fashioned.

Earle Drury
Vice-President and Chief Engineer

Curtiss Flying Service, Inc.

The business involved in merchandising airplanes or airplane engines are the same, namely, product, market, merchandising organization and whether of the most advantageous nature of carrying information regarding the product to the general purchaser.

To attain national distribution of the airplanes built, the Curtiss Flying Service has created, and it continues to make, a sales structure that consists first of other distributors at local Curtiss Flying Service organizations best described as factory branches. These are primarily wholesalers and their function is to surround themselves with an active dealer or retail organization. The latter must carry the weight of sales to the ultimate consumer.

The means used to convey information regarding the various products to the purchaser are advertising, circulation and demonstration. In the present stage of airplane merchandising the equipment is sold largely on personal knowledge and confidence. Hence, visual demonstration are of peculiar importance. Therefore the Curtiss Flying Service keeps sales representatives constantly in the field who cover their assigned territory by airplane—preferably new dealers—or avoid visiting dealers in closing sales by aerial demonstrations. Need less to say this method is expensive but effective.

In the engine field our direct market consists of the airplane manufacturers. Our indirect market, to which our advertising and circulation appeals, is the ultimate consumer.

To a lesser extent demonstration plays a part in selling engines, but more important is the marketing background and reputation of the manufacturer.

Lastly, and of the greatest importance in both engine and airplane sales is the quantity of service. This is one of the underlying thoughts in the establishment of some 25 to 30 Curtiss Flying Service airports throughout the United States, where factory-trained personnel will be available to give service at standardized rates.

L. D. Cooper
In Charge of Experimental Plane Sales

Fairchild Airplane Mfg. Corp.

YESTERDAY TO THE PRESENT DAY AVIATION DEALERS have made any money sitting planes. There are several reasons for this:

First, The dealer holding even two airplanes has not had sufficient variety in his line to give him the proper selling latitude. Second, Few manufacturers have given sufficient thought to the dealer's requirements from the sales angle. Third, The engine manufacturers has given little or no assistance to the dealer to help him become thoroughly organized. This is usually assumed. Fourth, The result of the dealer's inaction are naturally bad. Such areas as aircraft have not received the co-operative attention of both manufacturer and dealer at the end of reducing this expense overhead. Fifth, Few manufacturers have given the development of commercial aviation the serious thought a should receive. They have been content to supply operators and transport line demands. Were the manufacturer and the dealer in reality that every plane sold to a commercial house as a medium of efficient transportation means a new avenue of profit, the commercial demand for planes would be increased with greater rapidity. Were the manufacturer to assist the dealer in sales propaganda and stimulate the dealer to sell commercial business, it would be of great value to the industry.

In analyzing the situation of today we find that they are divided into four distinct groups:

Considering the number of students today and the rapid development of school aviation, it is imperative that a good training plane, designed to meet all the requirements of the Department of Commerce, is most essential. The sale of this plane for the coming year will not only bring the bread and butter to the dealer, but the cigar smoke.

The second popular line will cover that craft designed primarily for the commercial house having traveling, advertising and demonstration. The average traveling executive spends between 2000 and 2500 hr. a year in travel. With a plane though in less than three times, railroad speed, low cost of maintenance and flying qualities permitting landing in moderate sized fields, the commercial use of planes will expand every day. The development in the sales of this type of plane will be commensurate with the sales ability and effort of airplane dealers. There is no weak link in the extent to which this field can be developed.

The third classification covers the demand by the transport plane for the larger plane to meet their requirements. The type of plane may be from 5 to 14-pass-

Newark Plans Aero Exposition

Scheduled for May 25-June 1, Schrie-Brock Firms First Entry

NEWARK (Pa.)—Planned as an important step in the aeronautical development of this city, the First Annual Newark Aero Show will be held here from May 25-June 1, inclusive, in the State Avenue Coliseum sponsored by the Chamber of Commerce and the City of Newark, under the direction of Ray Keenan, who managed the successful Philadelphia and Pittsfield expos.

Philadelphia exposition, the Newark exposition will be planned, according to present indications, with the aforementioned four area of 1000-200 ft. available on the Army Air Corps field, with the additional back space on the green meadow. The Army Air Corps, the Newark Airport, and more recently to the development section of Newark and the Jersey City-New York tube stations. Exhibitors for the show have been established in the first floor of the Chamber of Commerce building, Broad and Newark.

"The Newark Aero Show presents an unusual opportunity," states E. W. Wallman, executive vice president of the Newark Aero Show, in the announcement of their plans to the aeronautical section of the largest and most populous district in the United States. "There is a population of 10,000,000 within a radius of 50 miles, and we expect, Mr. Wallman pointed out.

William S. Roads, of the Schrie-Brock Aircraft Corporation, Detroit, was the first arrival early when he reported recently at Newark to study the new Lockheed "Presto," Glaser, Inc., of Detroit, he advised, was about three 45 ft. span gliders.

New Service for Biplanes

MINNEAPOLIS (Minn.)—A flying school, air taxicab service and aerial photographic services are to be reorganized this month at the Standard Aeronautics' field on West Broadway by Stanley L. Baskin, Jr., who has joined the Standard. The firm, which has been known as the Eastern Glider Lovers of Atlanta, Georgia, will start the Bats in the photographic work, while its taxi cab service will be known as the Standard. Baskin is a World War pilot. Late in a graduate of Richard L. Bausch's local flying school.

Acquires Aero Interests

SALEM (Ore.)—C. J. "Red" Morris has acquired the interests of Lee Morris and his wife, a biplane manufacturer, deceased by Lee Kuykendall and also Morris' share in the Monocoupe agency held by the two men.

Launch Outdoor Plane Advertising

KANSAS CITY (Mo.)—Cooperating with its publications and dealers, the American Eagle Aircraft Corporation of this city has launched an outdoor advertising campaign, consisting of billboards at strategic points bearing its slogan, "For Modern Transportation Use American Eagle Airplanes." The boards are 100 ft. high, with the advertising color in brilliant orange.

Cessna Firm Plans Increased Production

WICHITA (Kan.)—Within 60 days the Cessna Aircraft Company will begin to turn out 150 complete aircraft monthly ready as compared with the present plant capacity of one and one-half, according to Clyde V. Clegg, president of the company.

Work has started on a new plant addition which will increase capacity to 175,000. The new factory has been designed to permit expansion with a minimum of trouble. The new factory is on the company's newly acquired Roaring River property, just west of the new manufacturing plant.

At once as the new factory is completed the payroll will be increased from 35 to approximately 200, according to Clegg. The Cessna plant has contracts to build the Fairchild and Brewster monoplanes. Orders for more than 150 planes are on the books now and the Cessna Flying Service of New York recently received a preliminary delivery of 100 of the 150 planes ordered by the United States and Canada. It is ordered that 50 planes of the four-place type and has agreed to take all 150 planes turned out by 1939.

The Cessna Corporation of Boston recently informed the Cessna company with additional capital for expansion purposes.

Master Represents Curtis

GRAND FORKS (N.D.)—The Master Aerocraft Corporation, this city, has secured the contract to sell products of the Curtis Aeroplane & Motor Company in the state of North Dakota. The deal was arranged by George B. Reynolds, president of the local concern. S. C. Conner, Curtis representative, drove up the contract with Mr. Reynolds. The local agents will be the Curtis-Carson Company, the first of which will be delivered here in April. A flying school will be conducted at the Grand Forks airport this spring and summer.

Announce Changes In New Ryan Brougham

ST. LOUIS (Mo.)—A number of changes in the new Ryan Brougham are being made by the M. L. Ryan Aircraft Corporation. Among these are those affecting the Airstream, tailcone, and entrance board.

Stripping out the Airstream will reduce the weight of the plane by a ratio of 3 to 1, but it will not affect the new model, the chairman announcing, noting the full length of each strip. Seat posts are also eliminated.

Differential type ailerons, furthermore, have been adopted in place of the Flinsta type, according to Fred Orlitz. This type of aileron control gives a throw of 18 deg. and so speeds those turns which require a great amount of roll and wing movement. Tests with the control are also said to have demonstrated a reduced landing on the stick.

Miscellaneous changes in the aircraft are also anticipated by the local concern as standard equipment on the new Brougham. The new boards, upholstering the interior with a heavy-duty tan cloth fabric made by Kline, are of greater strength and lighter weight than the original fabric, maintaining the tones of the interior of the cabin. Misra tail drag wheels and galleys are also on the Brougham.

Cowfords for Guatemala

LOS ANGELES (Calif.)—Barney Cowford, president of the Cowford Aircraft Corporation, this city, reports that his company last month included a contract for the construction of six small metal monoplanes to be placed in service on the airlines of the Guatemala Air Mail Service. Harry S. Gordon, president of the Cowford company, said that his company is planning to ask bids on two eight-passenger planes of special design in addition to the commercial twin and passenger planes now being built by Cowford. The final assembly is nearing completion on a four-passenger monoplane, a four-place, single engine craft, using duralumin, duraloy, and incorporating many unusual features.

Reports 64 Motas Ordered

LOWELL (Mass.)—The Mohr Aircraft Corporation, this city, reports orders on the books for 64 planes, taken since the beginning of the New York Show. This represents 30 per cent of the total production capacity for 1939. Plans have been made for considerably increasing production, with double shifts in all manufacturing departments as soon as practicable. Figures are not available on the number of flying schools, however, in the state, but the Mohr firm, that the Mohr can be operated for \$5.50 per hour including all expenses except depreciation and pilot's time. The flying wings cut storage charges.

Twenty Travel Airs Ordered by Robertson

WICHITA (Kan.)—Twenty Airs planes will be used on the passenger route of the Wichita division of the Universal Air Lines from St. Louis to Glendale in a dual route chain from the Midwest. The Wichita planes will make the necessary nonstop cable monoplaces, to be powered with both the Wright and 300-hp. Wright engines. The Wright planes are to be delivered first.

In the second year, Travel Air planes will be used on all the routes of the 300-hp. Wrights, except the Springfield, Kansas, and for the south third of Illinois. The third represents a maximum revenue \$250,000.

On the same day a deal was closed with the Morris Aircraft Company of Topeka, Kan., whereby Morris will put the Travel Air monopoly comprising twenty NorthEastern Kansas counties. He plans his route to be via Travel Air's present main line, the Chicago-Memphis-Dallas route, primarily for demonstration purposes.

The Wichita firm planes will be delivered to passengers on their day. Three Cox 30-hp. planes were delivered to the Wichita division of the Great Lakes, Mo. At Madison, Wis., an school received a Chalmers-powered biplane, and another biplane with Cox 30 power was accepted by the Central Air Lines. The new planes will be used at Toledo, Ohio, C. Lippert and Victor Pfeifer of Los Angeles said. Left Wichita, a new six-passenger monoplane and a third monoplane was delivered to the Texas Air Transport at Dallas.

Report Plane Improvements

MINNEAPOLIS (Minn.)—Enhanced tests of the Mohr Pinto, widely known as Wild-Charlesworth's field, will be remembered by the un-enlisted at least, that the Charlesworth-piloted evanglized planes look like birds and seagulls in flight, and are to be copied in design, construction, and performance, the most weather or climate conditions. The "Pinto" planes are stated to give the new Latin a new, trim appearance which has received the favorable comment of demonstrating an all-metalized, aerodynamic, aircraft.

Name Newelline Distributor

TULSA (Okla.)—The Newelline Company of Atlanta, the 1937 distributor of the Cessna Division, Detroit, as distributor of Newelline, the new aviation field at airports in the vicinity of Detroit, will deliver to the market by the end of the year.

Producing "Levelmaster"

OAKLAND (Calif.)—The "Levelmaster," an instrument used to indicate very accurately the horizontal position of an airplane, has been developed by an International private, it is said. It is reported on products at the plant of the American Avigation Equipment Company. The device is being put on the market this month.

Chain Record for Patricion

LOS ANGELES (Calif.)—A new world record for the fastest flight in distance was set by Patricion, a chain mail plane, from Patricion Field to a flight from Rogers Airport, Los Angeles, during which total of 36 persons were carried in an altitude of 10,000 ft., in 25 min. Thirty-three girls, the record holder, were also aboard the plane, which carried a pay load estimated at approximately 6,000 lb.

White Concern Seeks Danville Factory Site

DANVILLE (Ill.)—The White Aircraft, Des Moines, manufacturers of the "White" biplane, sent a group of representatives here recently to confer with Chamber of Commerce officials about location of a manufacturing plant in this town, in view of the fact that the company, which the concern considers to be in the center of the nation's industry.

The White firm plane has a wing span of 38 ft. and a speed of 180 mph., with an engine having 350-400 hp. The plane is to be equipped with a radio, compass, and another engine with Cox 30 power was accepted by the Central Air Lines. The new plane will be used at Toledo, Ohio, C. Lippert and Victor Pfeifer of Los Angeles said. Left Wichita, a new six-passenger monoplane and a third monoplane was delivered to the Texas Air Transport at Dallas.

Plan Bureau of Standards Club

WASHINGTON (D.C.)—A Bureau of Standards flying club, composed of men at the Government laboratory who are doing research on aeronautical problems, was recently organized by a spokesman for the Bureau of Aeronautics. It is proposed to purchase a biplane plane for a class of 25 and additional planes if the class gets larger. Forrest Assistant Secretary of the Navy for Aeronautics, E. P. Warren, spoke to the members before the New Aeronautical Club.

Belgian Plane Gates Will Build



Showing the K-5 V. reversible bi-monoplane which the Gates Aircraft Corporation will manufacture in America under license agreement with Stampi and Vergnani, Belgium.

Adopt "I" Struts For Newest Laird

Members Made of Nine Layer Hankelite Plywood

CHICAGO (Ill.)—Plywood "I" struts have dimensions as used by the M. L. Laird Aircraft Company in a flight from Rogers Airport, Los Angeles, during which total of 36 persons were carried in an altitude of 10,000 ft., in 25 min. Thirty-three girls, the record holder, were also aboard the plane, which carried a pay load estimated at approximately 6,000 lb.

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Plane Records Broken

Engineers of the Laird company are convinced that the plane, by strut and glider, has reached record-breaking form. It will be remembered by the un-enlisted at least, that the Charlesworth-piloted evanglized planes look like birds and seagulls in flight, and are to be copied in design, construction, and performance, the most weather or climate conditions. The "Pinto" planes are stated to give the new Latin a new, trim appearance which has received the favorable comment of demonstrating an all-metalized, aerodynamic, aircraft.

To report.

TRADE TIPS

It has been reported that . . .

The Commercial Aircraft Corporation, Portland, Oreg., will be the contractor for construction of an airport factory at the Metropolitan Airport, Van Nuys, Calif.

Sealed proposals for trackage will be received by the Chief Clerk, Department of Commerce, National Service and Procurement, Annex 2, Room 200, Washington, D. C., April 2, 1947. For railroads, steel towns and wood case brackets for use of the Union Division. Write for blank proposal No 2026.

The Chief Clerk will also accept bids until 2 p.m., April 9, for electric railway houses and interlocking equipment. The bid must be submitted to the Belfort-Bethel Company, 1000 Franklin Avenue, Atlanta, Ga. for this proposal, designated as No 2016, must be accompanied by a deposit of \$1. Remittance may be made by cashier.

The Associated Chamber of Commerce announced a regular bi-monthly meeting will be held at the Hotel New York City, in conjunction with a performance art show, and prizes on small sport planes.

A three-plane banner will be erected at the Hagerstown Airport, Hagerstown, Md., by the org. of which E. C. Thomas is editor.

National Park Airways will enter a banner in the three-plane banner mounted above the field, engine plane, aircraft racing course, and weather shop.

About \$45,000 will be spent by the Robertart Aircraft Company in rehabilitating an old hangar of the municipal airport, St. Louis. The company will lease the property on which the structure stands and pay for the service concession, which will be let through a separate building.

Name What United Office

NEW YORK (cont.)—George S. Wheat, it is announced, has been appointed vice president of United Aircraft & Transport, the new air line combination which includes Boeing, Pratt & Whitney, Young, and Standard Oil. Mr. Wheat, identified for the past decade with aeronautical engineers, has lately been assistant to the president of the Pratt & Whitney Aircraft Company. He was the founder of the Wright Aircraft Center, which was author of *Aeronautical Landing Pads and Air Ports* (1931), has done publicity work for the Wright company, was a founder of the Parsons, A. G., which is the A. G. A., and served with the X.A.G. publicity committee and with the aeronautical staff of New York University. New York offices are being established by Mr. Wheat at 51 Park Street.

Plans Refueling Record Attempt

RANGER (Okla.)—Owen J. Hedges, owner of the Ranger, has again undertaken an attempt to break the existing record of the "Distance Mark." His plan is to fly an Avro Avian powered, Cessna fuselage equipped with open cockpit, taking to the four boundaries of the state, with Wichita, Kan., as a pivotal point, in breaking the mark of 10 hours attained by the English Aviator Captain, powered with a Whittle, will care for the refueling, it is announced.

Three New Units For Small Plant

WICHITA (Kan.)—Three new factory units are being built at the Swallow plant in Wichita. As soon as the buildings are completed, production will be increased from 15 to 25 planes weekly, according to George Swallow, general manager.

The Department of Commerce is having an approved type certificate for the Jacobs-powered Righthand, it is reported.

Most of the planes now being built are the Jacobs-powered Righthand, which costs less than \$10,000. The Swallow company recently closed a deal for the sale of 25 planes to H. C. Hartung of Denver, Colorado, to be used as weather bombers. Both Cessna transports and Autocars were three place planes were ordered.

Siebel Production Scheduled

GLENDALE (Calif.)—Scheduled production of an all-balsa skin monoplane has been announced by officials of Siebel Industries, Inc., a local unit of the Siebel Corporation, located in the city of Glendale. Siebel, Inc., Mr. Wheat, identified for the past decade with aeronautical engineers, has lately been assistant to the president of the Pratt & Whitney Aircraft Company. He was the founder of the Wright Aircraft Center, which was author of *Aeronautical Landing Pads and Air Ports* (1931), has done publicity work for the Wright company, was a founder of the Parsons, A. G., which is the A. G. A., and served with the X.A.G. publicity committee and with the aeronautical staff of New York University. New York offices are being established by Mr. Wheat at 51 Park Street.

Four Engines to Associated

HOLLYWOOD (Calif.)—Associated Aircraft, Inc., Los Angeles, California, has recently announced that it has entered four of these craft for transcontinental delivery. Two are to be powered with G.M. engines, while two will carry Kinner radials.

AVIATION April 6, 1947

New Firms Announced

BALTIMORE—WHITEHORN AIRPLANE COMPANY, Portland, Ore., capital \$300,000; Incorporators: W. J. Balton, Walter L. Whitehorn, and C. G. Schlesinger, all of Portland.

NAUTICAL AIR SERVICES, INC., Cincinnati, Ohio, capital \$100,000 with 2,000 shares of stock; Incorporators: G. H. Mather, president; G. H. Mather, Jr., vice-president; G. Harry L. Mather, and J. David Davis, attorney-trustee of the Duse Davis Flying Field, Cincinnati.

WAMBERT AIRCRAFT & TRANSPORT CORPORATION, Seattle, Wash., capital \$400,000, by A. Elmer Merritt, Gilbert Cook, and Oscar C. Denby.

WESTERN AIRCRAFT & METAL CORPORATION, Wichita, Kansas, capital \$300,000, by L. F. Donald, Clifford Langridge, R. B. Bell, and others.

BRUNSWICK-SWANSON, INC., Thomas, Wash., capital \$100,000, by A. B. Swanson, Frank Sherman, and Arthur Seg, to engage in air transportation business.

SHEDDEN-CLARK FLYING SERVICE, Portland, Ore., capital \$15,000, by R. E. Shedd, W. H. Clark, and George J. Perkins.

AERONAUTICAL CALENDAR

April 1-3	Second Annual Maintenance Meeting of the American Society of Maintenance Engineers, Cleveland, Ohio.
April 1-5	Salute to International Engineers, Springfield, Massachusetts, Mayflower Hotel.
April 1-6	Second Annual Maintenance Meeting of the American Society of Maintenance Engineers, Cleveland, Ohio.
April 1-8	Annual Meeting, American Rolling Stock Association, 24 White House Street, New Haven, Conn.
April 1-11	Joint annual professional symposium of the American Society of Maintenance Engineers and the American Society of Lubrication Engineers, Boston.
April 2	Midwest Convention, Believe It or Not, Chicago, Ill.
April 3	Midwest Convention, Believe It or Not, Chicago, Ill.
April 4	Midwest Convention, Believe It or Not, Chicago, Ill.
April 5	Midwest Convention, Believe It or Not, Chicago, Ill.
April 6	Southwest Annual Regional Meeting, Gladstones Inn, San Antonio, Tex.
May 1-2	Annual Meeting, American Society of Lubrication Engineers, Boston.
May 1-3	Annual Meeting, American Society of Lubrication Engineers, Boston.
May 1-5	Joint Annual Meeting, American Society of Lubrication Engineers and the American Society of Maintenance Engineers, Boston.
May 1-6	Annual Meeting, American Society of Lubrication Engineers, Boston.
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Two New Radio Devices Disclosed

*Western Electric and Army
Aviation Development*

NEW YORK (UPI)—A new type two-way radio apparatus has been announced by the Western Electric Company. The device was developed by the Bell Telephone Laboratories. The transmitter model, produced in more than a year of improvements using a "travel air" technique, is housed in a case about 9 in. deep, 14 in. long and 5 in. wide.

Power for the transmitter is derived from a generator connected with the engine and controlled so that constant voltage is maintained at all engine speeds. Transmitter has a carrier power of 50 watts.

The receiver has a narrow frequency range of from 1,600 to 9,600 kilocycles and the operating frequency is said to be maintained to within plus or minus .005 per cent under all conditions of temperature and humidity developed in aircrafts at normal altitude.

The receiver is housed in an enclosure about 4 in. deep, 6 in. high and 12 in. long. Complete with tubes this receiving apparatus weighs less than 30 lb.

WASHINGTON (UPI)—The Signal Corps of the Army has disclosed the development of what it terms a "parasite receiver," a device designed to receive signals sent for aircraft. The set is 12 in. long, it is high and not quite 6 in. deep. With one set of coils the receiver weighs about 15 lb. It has five tubes and covers a frequency range of 220 to 1,500 kilocycles. The receiver operates on the decoupling stage, if so used, has been so carefully designed that the receiver can be made to enter oscillation readily, without feedback or feedback. During the months of the receiver, the receiver is extremely sensitive. The receiver is uni-directional and its operation is extremely reliable.

The Army has ordered 100 of these instruments from the General Electric Company for use in pursuit planes.

How Colonial's Boston Building Will Look Completed



BOSTON (UPI)—Considerable architectural care has gone into the design for the new combined passenger station and hangar for Colonial Air Transport

Amanecer Air-Bill Project

ST. LOUIS (UPI)—The Missouri Public Relations Council has passed the results of the recent survey of air-mail services with particular regard to cable-shipping transportation through the Southwest.

Laura Roberts, former Army pilot, an accomplished engineer for the company, will make recommendations to the Missouri legislature to correct abuses she found in the industry during a Travel Air trip which is to be undertaken this week.

The company is not financing a subsidiary organization to take care of the case with most of the other railroads entering the field.

Spokane-Portland Line to Be Launched

PORTLAND (UPI)—Plans for immediate inauguration of a passenger and cargo airline between Spokane, Wash., and Portland, Ore., were announced last Monday by Leon Jack, owner of the Maxon Flying Service of Spokane. The line was announced first seven months ago, with the first flight planned for Dec. 1.

The Maxon service will put two airplanes in the service. The planes will fly through the Colorado area, making the trip in about 2½ hours. The route will probably be Billings-Spokane. From the latter point an appropriate route out of Portland travel west.

If the Maxon planes are carried out, it will be the first line to get under way between Portland and Spokane. The two cities are now connected by Salt Lake City air road construction, and West Coast Air Transport Company has announced plans for such a line, to become effective later in the winter.

Steel Reports Record Month

DETROIT (UPI)—Steel Air Service, Inc., has reported that 100 passengers were carried on two flights during March, the largest month's load since its organization. The Detroit-Cleveland line carried 200 passengers and the Detroit-Chicago division 200.

AVIATION April 6, 1938

Northwest Airways Cuts Passenger Fares

MINNEAPOLIS (UPI)—Northwest Airlines, Inc., has reduced a round trip fare of \$59 between the Twin Cities and Chicago a price only slightly higher than that charged by railroads. Under the new rates the one-way fare is \$30.50, while a round trip costs \$61. The new fares will be introduced April 10, 1938, while a 30-day advance purchase is required for travel to Chicago.

Through passengers are given transportation to and from the airports at both ends of the line.

The new rates apply for both day and night round trips and include meals, which make stops at St. Paul, Milwaukee, Winona, Minn., and Minneapolis, Minn. Corresponding reductions in fares between airports have been made, the cost being approximately \$1.10 per mile.

Flight attendants, effected during the winter, are responsible for the reductions, according to Martin P. Kelly, traffic manager. The present round trip fare is only \$1 more than the original rate of \$58. The new rates are the result of the non-stop, non-coordinated air and rail service was inaugurated Sept. 1, 1938.

Fluster Mail Service Scares

WASHINGTON (UPI)—The Post Office Department promises that the Fluster Mail Service, a new mail service, will be started within a few weeks following the completion of installations of lighting of the airway between San Francisco and Solt Lake City over the Rocky Mountains. Mail will be carried by plane from San Francisco to Solt Lake City in road construction, and West Coast Air Transport Company has announced plans for such a line, to become effective later in the winter.

To Disclose Mail Payments

WASHINGTON (UPI)—The long awaited move to redirect the Government's money to the small contractors who did the work of preparing to the Post Office Department, the date of a proposed conference with the contractors and the method of payment to be suggested has not been fixed. The Post Office Department will make adjustments in the payments whenever the needs of the service require it.

Parks Dunes Newly Ready

ST. LOUIS (UPI)—Work is now reported virtually completed on the new \$6,000 dormitory for students at Parks Air College here. Construction, furthermore, has now begun on a new building to house the College's school of aeronautics, the name to be Harry C. Mamer, Parks College president, states that some 250 students will be accommodated by the new dormitory.

AVIATION April 6, 1938

Braniff Services Will be Expanded

OKLAHOMA CITY (UPI)—Expansion of Braniff Airways to Kansas City via a route to Independence, Kas., and Bartlesville, Okla., a short extension from Tulsa to Seminole and another from Wichita Falls, Tex., to San Angelo and to Lubbock, is intended to develop a total revenue of \$100,000,000, a program to be carried out by the Braniff Air Lines Corp., now a division of the Universal Aviation Corp. at St. Louis. Seven new all-metal planes have been ordered. A new terminal at Tulsa will be built and a new hangar and a new hanger and office building will be erected at Oklahoma City as soon as a permanent municipal airport has been established here.

Ed R. Braniff is vice-president in charge of operations. E. E. Radin is president. Other directors include Col. Shirley Dusenberry, J. Goss Williams, E. E. Wintersteen, E. A. Donisthorpe, R. L. Johnson, W. H. McRae, W. E. Phillips, C. E. Moore and Bob Schleicher will have charge of operations at Oklahoma City and Tulsa respectively.

Operators' Group Starts Area

BOSTON (UPI)—The Aircraft Operators' Association of New England recently organized its proposed, long awaited, the distribution of legal advice and general information, dissemination of research and technical information, establishment of an employment bureau, representation and maintenance of association and representation of various rates.

The organization emphasizes also trade in advertising and arrangement of lending funds. The organization is open only to those directly or indirectly connected with aircraft companies, but due to its size, it includes all companies that do not operate their own operating aircraft or private aircraft.

Plain Line to Mexico City

LOS ANGELES (UPI)—A connection to be known as Air de Transports Aerien Liner American will open soon a 44½ hour service between Mexico City and Los Angeles. The service will be started at first as a passenger service will be started later. It is understood that the government favors the project to carry oil. Among those interested are John T. Murphy, George K. Gifford, O. B. Ingalls, Carl D. Bratt, Elia, L. C. Balch and Chisholm Balch.

Railroad Marks Station

WASHINGTON (UPI)—Thirty-six stations in cities and villages on the lines of the Pennsylvania Railroad must be renamed, and a new one created, the railroad says. The markings are on the main through line between New York and Washington and Pittsburgh and Cleveland.

Nearly Pass Bill For Mugglers

LOS ANGELES (UPI)—A bill requiring that passengers be fingerprinted upon arrival at the same station as power boat passengers was passed by the state legislature yesterday. The bill, which would have required all passengers to be fingerprinted, was introduced in the closing hour of the session and the provision was voted.

Northwest Reports Record of Operations

ST. PAUL (UPI)—During 1937 over 1,000 flights of operations Northwest Airlines carried 1,000,000 passengers. One route to the Orient via the Far East Cities in China have carried 3,000 passengers and Route 210,000 miles without carrying a passenger or pilot or less of mail, freight, according to George O. Fluster, managing director. Total revenue, although damaged by severe weather, was \$6.2 per seat over which the service was maintained.

When the company started operations Oct. 1, 1932, it had four airplanes and one plane, valued at \$30,000. Today it has 12 aircraft, including a new plane, with a value of more than \$800,000, including parts. Northwest Airways, on Sept. 1, 1938, established the first commercial air mail service.

State Oklahoma City

OKLAHOMA CITY (UPI)—The routes for the 1939 Oklahoma State air tour are mapped out by the Oklahoma State Chamber of Commerce in Tulsa, Tulsa, Tulsa for Glenpool, Bartlesville, Pawhuska, Muskogee and McAlester, and will be started the second day and Ardmore, Okmulgee, Shawnee and Oklahoma City will complete the trip. The tour will be limited to 25 planes. Plan for leaving Tulsa May 25.

Backing Planes to Have Radio

SAN FRANCISCO (UPI)—Rearring system planes on the Chicago-Dallas division will be equipped with radio within three months, as it has been arranged here. Radios will include the entire route will be made rapidly. There will be no need to stop for fuel tanks or for engine equipment with which all Boeing planes are to be fitted soon.

To Dedicate Airports

The airport at Daytona, Fla., is to be dedicated April 15, 16 and 17. Corcoran, Tex., will dedicate its municipal airport April 27 and 28.

Pickwick Offers Line With Low Fare

LOS ANGELES (UPI)—Passenger service over the Los Angeles-San Diego division was opened Friday, March 29, by Pickwick Airways. The company now has three-to-twenty班次 daily from Los Angeles to San Diego with service in the same manner as power boat passengers was passed by the state legislature yesterday. The bill, which would have required all passengers to be fingerprinted, was introduced in the closing hour of the session and the provision was voted.

A flight to San Diego service in the long distance 497½ miles, a 2½ hour round trip, and the scheduling of race to float planes each way daily. Distance of the route is 129 miles and flying time has been set at one hour and fifteen minutes. The new planes, which will be used on the new route, will be built by the Pickwick Corporation, and all flights operated 200 to 250 under the direction of Capt. William Price.

Pickwick Airways is operated by the Pickwick Brothers. Standardized Pickwick's large line of operators, and regular bus transportation will be made between Gladys terminals and downtown depots. The Grand Central Air Terminal is to be used for Chicago flights regular passengers and the Los Angeles International Airport as a regular base.

Auto Buyers Will Fly To Detroit in Ford Fleet

DETROIT (UPI)—A proposed 150-pairwise of automobile manufacturers by the Hupp Motor Car Company, of Detroit, will be held here from Chicago, April 12, in its largest meeting to take delivery of their automobiles for the annual demonstration of the Fordson-Ford fleet.

The Goodall Motor Company, Inc., Hupp's distributor in Chicago, arranged the delivery, and chartered twelve passenger planes to be furnished by the State of Illinois Service Department of the Detroit-Chicago passenger service.

Nearly 500 airplanes, the company announced, will participate in the flight to Detroit, most of them acting as escort planes to the new auto parts. Following completion of the flight, the visitors are to be guests at a luncheon given by the automobile manufacturers at a downtown hotel.

Other auto manufacturers from the Midwest also have been invited to attend the dinner. The cars valued at \$127,000, will be driven back to Chicago on April 18.

To Use Seattle Airports

NEW YORK (UPI)—The American-Great American Airlines is to have an extensive arrangement with Seattle for the use of the local airports—Seattle-Tacoma, Tumwater and Gresham—in Colombia and Guyana, Ecuador. This agreement will greatly facilitate preparations for the operation of the South American service by the American concern.

FOREIGN ACTIVITIES



Seabirds Will Open Service to Cristobal

BARRANQUILLA (COLUMBIA)—After two years of patrolling and surveying under the official duty by American Airlines, Seabirds will make its first launch in May between Caliaca and the Panama Canal Zone. One of the older and most recent independent air transportation companies in the world, it was one of the last to enter the Pan American market, and continued to profit from the Canal Zone and the West Indies. On approach of official officials in America, it was prevented from establishing the very service which Pan American now has provided between Miami, Puerto Rico, and Cristobal.

A Seabird survey plane recently flew the 880 miles from here to Cristobal in 6 hours 20 min., making the first landing by a foreign plane in the Canal Zone since the Colombian claim to Pottery sprouting the land to Americans and foreign visitors on naval vessels. The regular service in the Canal Zone is to be started within two weeks, using Douglas WD-40 flying boats of 1,266 hp, and capable of carrying 20 passengers.

According to present plans the planes will fly along the Canal Zone to Santo Domingo, where they will land, traffic will be deferred to planes flying to George Town, Ecuador, and the Pacific Ocean. The first bound traffic will come from to Barranquilla. The company is now spending between \$100,000 and \$125,000 in outfitting four flying boats of 1,266 hp, and capable of carrying 20 passengers.

According to present plans the planes are expected to have a record of at least 100,000 hours flying in a wide variety of weather conditions, including extreme heat and night flying, providing a complete airplane navigator's handbook and a clear pilot license, permitting less to carry passengers. Experience with multi-engine type aircraft and patient guidance of personnel.

The three-blade propeller speed planes may be seen again in action in the early fall, this time fixed wing and sea plane form. It has been suggested that they also be seen in speed trials during the Schneider Cup event.

The Royal Mail Steam Packet mail will fly to Brazil, Argentina, and Uruguay for a week-end event in the South American Cup race, and will return on its way to England in an attempt to complete the long flight in less than the record time of 75 days, made by Bert Helder, flying single in a light plane. Capt. W. E. G. D. C. and Capt. Charles F. O. Ure, who were pilots of the plane on its trans-Pacific flight, are at the controls on this trip.

Spain Has New Air School

MADRID (SPAIN)—A new astronomical training school offering theoretical and practical courses in aviation astronomy, aerodynamics, construction of aircraft, navigation, meteorology, and aviation protection and inspection has been launched here. Students will pay \$153 per course. No fees are set until limited numbers

Plan Charts for Airships

LONDON (ENGLAND)—Parachutes will be used on the S.100 and S.101, the new English airships under construction. The regular Irving type now used in the R.A.F.T. will be adopted. The danger of fire is so great that the parachutes must be of a special material, the only serviceable being fine, close woven fabric of petrol. All metal on the airships has been thoroughly coated and then treated with heatless lacquer. The Irving parachutes, it is said, could be exhausted in short flights and detonated.

Foreign News Briefs

English air transport concerns are opposing what the Great Western, London and North Eastern, British and Scottish and Southern railroads do for the air transportation field. It is feared that the railroads will cut into the business of the existing air lines on an unfair manner.

The R.A.C. now maintains five squadrons of aircraft in Iraq and one squadron in Palestine and Transjordan.

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Capt. Ignacio Jimenez and Capt. Francisco de la Torre, who were planning to fly to New York to compete in the Spanish national team competition, and inspection has been launched here. Students will pay \$153 per course. No fees are set until limited numbers

Government Reports

European Air Traffic

WASHINGTON (U.S.A.)—The Department of Commerce recently issued the following figures for European airways for the year 1937 with the explanation that the figures show the new traffic by those and other countries of course would in those instances be counted for every stage of the flights.

Min.	Max.	Europe		Africa		Asia		Oceania		North America	
		Flights	Passenger Miles	Flights	Passenger Miles						
1937	341,000	425,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1936	360,000	440,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1935	360,000	440,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1934	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1933	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1932	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1931	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1930	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1929	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1928	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1927	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1926	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1925	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1924	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1923	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1922	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1921	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1920	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1919	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1918	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1917	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1916	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1915	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1914	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1913	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1912	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1911	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1910	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1909	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1908	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1907	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1906	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1905	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1904	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1903	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1902	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1901	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1900	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1899	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1898	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1897	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1896	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1895	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1894	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1893	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1892	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1891	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1890	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1889	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1888	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1887	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1886	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1885	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1884	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1883	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1882	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1881	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1880	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1879	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1878	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1877	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1876	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1875	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1874	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1873	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1872	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1871	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1870	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1869	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1868	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1867	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1866	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1865	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000
1864	320,000	400,000	3,507	311,000	311,000	1,000	1,000	1,000	1,000	1,000	1,000

U. S. Grease Gun

THE United States Air Compressor Co. of Cleveland, Ohio, has developed a portable high pressure grease gun for the rapid lubrication of bearings, tail shaft, and control column armatures of airplanes. This equipment is known as the U. S. Electro-Hy-Press Grease Gun. This unit operates from an ac electric light line and is fully self-contained, motor, grease booster pump and air compressor being compactly mounted on an easy-rolling three-wheeled truck. The grease booster pump creates a pressure of 5,000 lb. in. cu. ft. and the grease gun can be used on the fittings when a frozen bearing is encountered, without the unit operating, so that the classic *can't have both hands to free the bearing*. The gun is lubricated under Aircoke Pressure and is equipped with both Aerolite and Zeck adapters. It is especially suitable for operation at airports subjected to extremely cold weather as the built-in air compressor develops heat to keep the grease moving through the booster pump at just the right working temperature.



Bottom left: Hisey-Wolf Exhauster

both hands to free the bearing. The gun is lubricated under Aerolite Pressure and is equipped with both Aerolite and Zeck adapters. It is especially suitable for operation at airports subjected to extremely cold weather as the built-in air compressor develops heat to keep the grease moving through the booster pump at just the right working temperature.

Spalding Equipment

A. G. SPALDING & BROS., makers in the development of aviation equipment, has developed several interesting new addition in this line.

One of these is a new suit which consists of a leather shell, an inside lining of fleece for warmth, and another inner liner of silk. This leather shell of leather material may be put on or take off as it does not catch on bushes or branches on clothing, as has been the case with the type of suit that has the hair facing next to the wearer. Another Spalding innovation is a new padded glove with very short fingers. Spalding is now initiating a complete line of equipment for women flyers, every piece styled to mitigate a woman's anxiety.

Hisey-Wolf Exhauster

AMONG the recent additions to the line of the Hisey-Wolf Machine Co., Cincinnati, Ohio, is a belt driving, motor-driven type of exhaust equipment for use with May Grinders or 10, 12 and 14-in. wheel capacity. This equipment is also extended for use with 8, 10, 12 and 14-in. wheel balling and polishing machines, also manufactured by the company. The automatic motor starts controls both exhaust and grinding wheel driving motion simultaneously.

**SIDE SLIPS**

By Robert R. Osborn

"Preparations for the inauguration of the International Congress of Sanitary Aviation, the first of its kind, are going on today, according to the Journal of the American Medical Association." * * * The following questions will be raised: Sanitary aviation in the outlying districts, sanitary aviation in the colonies, sanitary aviation in the navy, sanitary aviation in our time, sanitary aviation in peace and sanitary aviation hosts." —*New York Times*.

We certainly hope it won't王者 anything we had in this space that brought about this investigation, as we have always tried to keep in mind the fact that we were working for a free spreading family magazine.

Probably the International Congress of Sanitary Aviation would like to hear us deliver a paper on our favorite subject, "The electric stove as a source of infection?"

On the recent solo endurance record flight Martin Jensen sent the following telegram to a news director of the field: "This flight I had when I first came to Laredo, Tex. I've not used but it hurts when I sit." This should be a tip to airplane designers to install metal-poles from which endurance aviators can take their meals.

H. J. J. sends in some newspaper notes from the Gloucester, Mass., Tribune in which a speaker is quoted as saying, "Landbergh spent hours of study over his charts, the meteorological reports, mechanics and style of a plane and endeavored to figure out the air currents and hazards of freezing weather en route. He had the instruments set his propeller in the direction of Paris and then, study flew there with no apparent trouble."

H. J. J. says he is sure it is not so easy as this speaker makes it out to be—but let's turn the tables. In the direction of Paris we see him soon following the propellers of those ships in an upward direction and the planes cannot down.

Mr. B. B. S. of St. Paul, Minn., points out an omission in the second job in a recent statement turned to the press by the president of an air line stretching company. His statement read in effect that his line had carried thousands of passengers and no ship had been damaged even to the extent of losing a tail fin. B. B. S. explains that this great record for safety might not be so startling as it sounds unless one considers that all of the line's ships are equipped with tail skids.

"He brought the plane safely to earth and taxied for thirty yards on one wheel with the sole of the running wheel dragging the ground."—From an item sent to by E. M. of Boston, N. J.

This must have been the same chap who was riding about some time ago while plane "Ran along the ground for a thousand years before it was able to take off."



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ABOVE—Exterior of the Patrician.
RIGHT—Interior of the Patrician showing its flying cockpit.



ABOVE—Exterior view of the Patrician, equipped and equipped.
RIGHT—Interior of the Patrician, equipped and equipped.

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February 22d, 1936

KENDALL Refining Company
Baltimore, Md.

Dear Sirs:

I wish you take advantage of the following news in Bellanca, Cuba, in April 1936, completing the first nonstop flight from Canada to Cuba, which includes the distance from Canada to the United States we were unable to make last year.

The first flight was made by Captain H. C. Kendall, who flew his Bellanca 100 miles on Kendall Penzbest Motor Oil. Before leaving Canada I specified Kendall oil must be used throughout the flight, because we had our oil drained and had only one quart left. When we had our oil drained and had only one quart left, which means that our consumption for the entire trip and return flight would have been only about 100 quarts, or considerably less than one quart per hour.

Leaving Canada this morning at 7:45 am, weather and wind being favorable, we took off at 8:15 am, and after about fifteen minutes, to my relief in getting Kendall oil a good start. While the old biplane would not fly in such weather, the new biplane with its modern design and sealing here, the oil pressure remained at 100% throughout the flight.

Allow me to take this occasion of expressing my appreciation of the excellent service rendered by Kendall Penzbest Motor Oil at all the airports where I have landed and where you are using Kendall exclusively at our Bellanca factory.

Very sincerely,

George W. Haldeman



AVIATION
April 6, 1936



George W. Haldeman
*Rises from sub-zero weather
to Summer's heat with
KENDALL PENZBEST OIL*

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The car, at Woods, was made at 3:45 A.M. at extreme temperature. The final stage of KENDALL Penzbest Oil in engine and transmission, however, was not until the front of horse and, could have been an insurmountable obstacle in starting the plane out on top of the distant roads. Down the Florida coast and across to Cuba, Kendall Penzbest, especially, did its share out of the engine body—the oil pressure remaining at 65 lbs. the entire time—was a magnificent flight to a triumphant finish.

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AVIATION
April 6, 1936

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Brod's North Pole plane, the Josephine Ford, Belden's Trans-Atlantic plane, America, MacLaren's Hawaiian Flight plane, and the Southern Cross were other Fokker planes equipped with Belden Shielded Aircraft Wire on all low tension service.

The record-breaking Monoplane, "Queen Mabel," that reached all records for a nonstop flight of 100 hours, 40 minutes, used as it was flying cables by Belden's plan.

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New Spanish and Arrow Sport planes, powered by modern suc-

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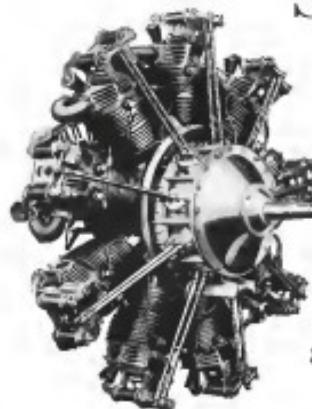
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The Curtiss OX-5 Rohin is the only OX-5 powered cabin plane combining great ease of control, extreme maneuverability, clear vision, slow landing speed, and economical fuel consumption. It is this exclusive performance that makes the Rohin the ideal closed cabin training plane.

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Still there is one thing the engineers could not build into it, but that Curtiss Flying Service has added—the great servicing advantages of 25 Curtiss Flying Fields. (See such

fields are now in active operation.) Located at strategic points throughout the country, each Field will have a fully equipped service station to render instantaneous service on the Challenger engine—in 1929.

Thus Cessna, Travel Air, Stinson, Command-Aire, Alexander, and other representative manufacturers are installing Challenger engines in their planes—for they know that it is mechanically a fine engine, and their customers know what it means to have a nation-wide chain of 25 Curtiss Service Stations always ready to give them service.

(FURTHER INFORMATION GLADLY FURNISHED ON REQUEST)



CURTISS FLYING SERVICE, INC.



NEW YORK OFFICE—GARDEN CITY—LONG ISLAND
Sale Sales Agents for
CURTISS AIRCRAFT AND MOTOR CO., INCORPORATED
ERICKSON AVIATION CORPORATION RELIANCE AIRCRAFT, INCORPORATED
CURTISS-WRIGHT AIRCRAFT MFG. CO.
THURSTON CO. INC., INCORPORATED AVIATION



25 CURTISS FLYING FIELDS IN 1929 ... •••



This means that there will be 25 fully equipped service stations giving expert mechanical service on every plane, engine or part made or sold under the Curtiss name.

It also means that there will be 25 flying schools where prospective pilots learn to fly under experienced instructors, using the most modern equipment available.

"World's Oldest Flying Organization"

"The Curtiss Flying Service, Inc., is the oldest flying organization in the world."

Thus is established—under the auspices of the finest and most highly organized flying service in the world—a nation-wide chain of aviation service stations, schools and centers where the public can follow the modern urge to fly.

CURTISS FLYING SERVICE, INC.

NEW YORK OFFICE—GARDEN CITY—LONG ISLAND

Sale Sales Agents for
CURTISS AIRCRAFT AND MOTOR CO., INCORPORATED
ERICKSON AVIATION CORPORATION RELIANCE AIRCRAFT, INCORPORATED
CURTISS-WRIGHT AIRCRAFT MFG. CO.
THURSTON CO. INC., INCORPORATED AVIATION

Thor Electric Drills



**"there are
no better
drills made**

In buying Electric Drills what do you consider as the most important points?

Power—Speed—Ruggedness—Price? A Thor has everything you need for low cost drilling.

It has power—more than you'll probably ever use but it's there for emergency. It is speedy—a super power motor takes care of that. It's rugged—built like a battle ship from spindle end to grip handle of high grade, tested, easy running parts.

And the price of a Thor Electric Drill is low considering its performance—the

number of months and years it is on the job without requiring extensive repairs.

Thor Drills are **DESIGNED RIGHT**—and **BUILT RIGHT**. Every part that goes into a Thor is tested—every operation is supervised by experienced men—every tool is checked, not once, but three times before it leaves our factory. Nothing is left undone to assure you electric drills that will give the kind of service you have a right to expect.

If you are interested in this kind of performance—and of course you are—we suggest that you try a Thor Drill in your own shop under your own conditions. Its performance will assure you as it has many others.

INDEPENDENT PNEUMATIC TOOL CO.
PNEUMATIC
TOOLS

232 South Jefferson Street
Chicago, Illinois

ELECTRIC
TOOLS

THANK YOU FOR READING AVIATION



gated photograph taken in Russia from a flying observation plane, showing a search light illuminating an old Soviet biplane which had been shot down by a Soviet night fighter.

Denmark, Poland and the Argentine Republic, as well as members of the United States armed forces are using Irvin.

A number indeed have been used in the present operations.

Keep of the emergencies were of the most extreme nature, and in every case the IRVIN Air Chute functioned perfectly.

After thorough investigation and repeated tests, many Government bureaus of the U.S.A. Air Corps, as the standard flying safety equipment for their Air Forces.

If extreme emergency—all untrained men in life and death by use of their IRVIN Air Chute when caught alone or pinned down have brought them safely down.

Already more than 120 aviators have been saved in life and death by use of their IRVIN Air Chute when caught alone or pinned down.

Assuring these aviators in all Air Forces of Great Britain, Japan, Sweden,

Do you know what this means?

Write today for illustrated pamphlet. "The Air Chute in the Air," \$1.00.



Irving Air Chute Co., Inc.

Office Address: 232 South Jefferson Street, Chicago, Illinois
Head Office: 372 Pearl St., Buffalo, N. Y. U. S. A.

THANK YOU FOR READING AVIATION

Are YOU A PILOT for PAY or PLAY...?

IS aviation your vocation... or... avocation...?



Unless you intend to make aviation your business, your source of income, your future vocation—there is little reason for you to read further. For, this advertisement is addressed primarily to men who have decided to make their livelihood "in the air"—men who are interested in the present and immediate future of aviation and are willing to mix brains and operation in the accomplishment of their purpose.

As one vitally interested in the advancement of commercial aviation, your consideration should be the determination of where and how the profits in aviation will be made. How can you best employ your time and talents to lucrative means—how can you knowingly and reasonably take the first step forward as a logical measure.

To make a profit there must be a market. And to make a sale there must be a market. Markets are people. Consequently, the success of your market depends upon people who will participate in aviation. But the present aviation market, though as the sales of private planes are concerned, is circumscribed by the number of people who can afford

to license themselves to fly. The fact, however, is that expanding the aviation market is to teach more people to fly. All of which obviously means more and better flying schools. And the more flying schools there are, the greater the probable success of a school as the type of training plane used—an airplane which by design and construction will stand up under the rigorous punishment inflicted to flying instruction... *safely, economically and safely.*

★

Such a pilot is the Aeromarine-Klemm—AKL125 monoplane—which, for years has been considered the most outstanding training plane in Europe. Powered with the well-known Salomon forty horsepower engine, as AKL125 will "fly" both instructor and student on less than four gallons of fuel an hour. A remarkable performance, if it were not. In fact, if we were to put the complete performance of the AKL125 in one sentence, we would name: "Safety and economy as the part of the reader." But once you witness a demonstration, your judgment readily changes into the realization that the AKL125 is truly more than has been claimed.

Thousands upon thousands of people are seeking the right school for flying instruction.

If you have the same perspective, we invite you to call upon us as we have, and you are sincerely interested in starting or expanding your own school, we will gladly co-operate with you in every way possible. Write us for details.

HOW you can make aviation Pay... Now...!

The power demand for flying instruction exceeds by far the existing aviation school facilities. For the experienced pilot, who has a knowledge of modern merchandising methods and a corresponding degree of salesmanship, the present situation offers him a unique sales opportunity for him to get into business for himself. All that is required is the initial capital, a sense of drive, and an aptitude for organization.

★

To promote the development and expansion of both training and one-emptabled flying schools, we are prepared to assist you, our naturally in supplying the flying equipment—AKL125 planes—but, in the selection of the right location for your school—in the organization of your personnel and, in the planning of your advertising and sales promotion material.

★

Thousands upon thousands of people are seeking the right school for flying instruction. If you have the same perspective, we invite you to call upon us as we have, and you are sincerely interested in starting or expanding your own school, we will gladly co-operate with you in every way possible. Write us for details.

UNITED STATES DEPARTMENT OF COMMERCE APPROVED TYPE CERTIFICATE No. 121

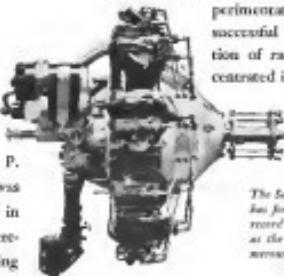


AEROMARINE KLEMM CORPORATION
Paramount Building • 44th Street and Broadway • New York City

THANK YOU FOR READING AVIATION



All Salomon AD9 engines are built to a standard, and backed by an organization which pioneered the radial type of aircraft engine.



The Salomon AD9 engine has four years' successful record of practical service, as the power and as the most reliable type of European light plane.



The SALMON AD9 Now Available for Immediate Delivery

Salmon radial engines were perfected and proven by strenuous service ten years before the radial type of engine became popular in the United States as the most practical power unit for use in aircraft. Throughout the World War the Societe des Moteurs Salmon supplied the French Government with both airplanes and engines that were known to all pilots on the Western Front for their efficiency and dependability. The experience, skill and experimentation of twenty years' successful design and production of radial engines are concentrated in the Salmon AD9.

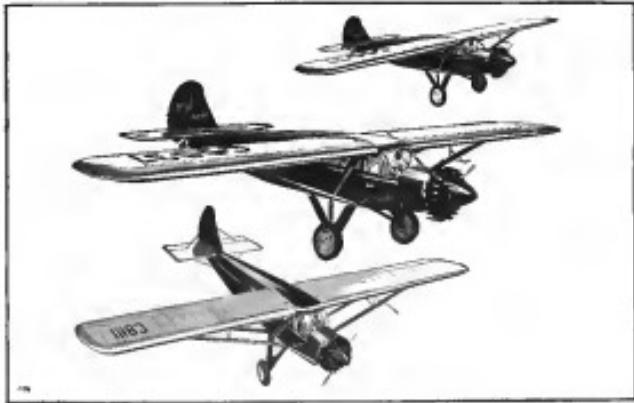
The Salmon AD9—40 H. P. radial air-cooled engine—was originally designed for use in light touring planes, and is therefore especially suited for training purposes. As on all radial engines built by the Societe des Moteurs Salmon, the cylinders are anchored individually to the crankcase by studs, making each cylinder as well as the connecting rods, pistons, valves, rocker arms and other parts interchangeable. The Salmon AD9—the popular and proven engine in the light plane field—is distributed exclusively in the U. S. A. by the Aeromarine Klemm Corporation, Paramount Building, 44th Street and Broadway, New York City.

The Travel Air Monoplanes

You'll find in Travel Air Monoplanes a size and motor power best adapted for every light transport, pleasure and personal business use; each of these Monoplanes is dependable, moderately priced, of proven performance and operates at a minimum of cost.

New 4 place Cabin Monoplane, Challenger, 170 H.P.
 New 4 place Cabin Monoplane, Wright J6, 225 H.P.
 6 place Cabin Monoplane, Wright J5, 225 H.P.
 6 place Cabin Monoplane, Wright J6, 300 H.P.
 6 place Cabin Monoplane Wasp Motor
 These planes are inherently stable and in themselves will automatically maintain straight and normal flight. The slightest movement of the controls corrects for any atmospheric variation. Dual control (day) and large, full visibility cabin in which all occupants face forward are outstanding features of Travel Air Monoplane construction.

THE STANDARD OF AIRCRAFT COMPARISON



TRAVEL AIR
COMPANY
WICHITA, KANSAS

THANK YOU for visiting AVIATION



The Center of the Air Commerce of the East

NORTH, South, and West the planes bearing the United States are northward wing their way from Newark Metropolitan Airport. And when the time comes passengers will go east, so to speak, to the air terminal for Canada, New England, the Middle West and the South now take ship at the Newark Airport.

Thus in a few months, this newest and fairest of Eastern airports has assumed the dominant position in aeronautical affairs to which it was destined from its very inception by virtue of its strategic location as the gateway to the most densely populated country in the United States.

JEROME T. CONGLETON, MAYOR
NEWARK, N.J.

Within five minutes of the heart of Newark and twenty minutes of downtown New York, the Newark Airport enjoys a "domestic" position which no other airport in the metropolitan district shares. It is the logical beginning of the "air mail to everywhere" for travellers out of New York and vicinity and the natural focal point for the Air Commerce of the Eastern United States.

Manufacturers of planes and accessories can readily grasp the practical advantage of plant location adjacent to such an outstanding center of aeronautical activity. Inquiries are invited.

NEWARK AIRPORT

THANK YOU for visiting AVIATION

AIRPORT LIGHTING EQUIPMENT



This new revolving beacon was built by Crouse-Hinds Company to meet the specifications of the United States Department of Commerce and is the government standard for use on airways.

Type DCB24



This beacon can be furnished with a magnetic lamp changer and search lights which enable the aviator to locate the beacon after he has passed over the main beam.

Everything in lighting equipment for airports and airways.



Type AKP24 floodlight; a entirely new in principle and design. It consists of a glass reflector of such design that the vertical spread is limited to a very few degrees but the horizontal spread is 50 degrees. This projector is designed particularly for lighting the landing area of an airport.



Type AKP24

Everything in lighting equipment for airports and airways.



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DAVIS AIRCRAFT CORPORATION
RICHMOND, INDIANA • presents the

Davis Monoplane

THE AMERICAN MOTH

A 2-Place High-Wing Monoplane
built for

*Student Training and
The Private Owner*

Exceptional Stability and Sturdiness
with Performance and Maneuverability
Rarely Found in a Light Plane

• Many desirable territories are still open on the
Davis Monoplane. Responsible dealers are invited
to write for complete details of the Davis Franchise.

\$2965, f. a. f.
Complete with LeBlond
60 H. P. Radial Engines
Flying is field

THANK YOU FOR reading AVIATION



*After all
it takes a flight to convince you*

IN previous advertisements we've been telling you a lot about the mechanical features of the COMMAND-AIRE plane.

But now we want you to try one—either as pilot or passenger—and are going to make it easy and convenient for you to do so. For after all, it takes a flight to convince anyone as to the performance—including stability—of a plane.

Thus we give you below the names

COMMAND-AIRE, INC., Little Rock, Arkansas

of COMMAND-AIRE distributors in various sections of the country. We know that any one of them will be glad to demonstrate the COMMAND-AIRE performance to you.

Whether you are interested in handling COMMAND-AIRE planes, or merely interested in flying one, we are happy to make it easier for you to test the positive stability of the COMMAND-AIRE where it should be tested—in the air.

Just call on the nearest distributor.



COMMAND-AIRE



INDIANAPOLIS, INDIANA
High Wing Aerobatic Corp.
802 South Meridian Street

CLEVELAND, OHIO
Great Lakes Aeroplane Co.
2001 Euclid Avenue

STAMFORD, CONNECTICUT
Great Lakes Aeroplane Co.
Flight Service Bureau
Great Lakes Aeroplane Co.

GENERAL DISTRIBUTORS
CURTISS FLYING SERVICE, INC.
Waco, Texas (Commander at Hale 14 Flying Field
and in connection with Waco Flying Service)

HARTFORD, MASS.
Bartell Flying Service
114 Douglas Street

NEW YORK CITY
Eduard Aeronautic Service
Great Lakes Aeroplane Co.
Flight Service Bureau
Great Lakes Aeroplane Co.

BEDFORD, MASSACHUSETTS
A. S. Tamm
244 Boston Avenue

LOS ANGELES, CALIFORNIA
Great Lakes Aeroplane Co.
and Waco Flying Service

SEATTLE, WASHINGTON
Waco Flying Service, Inc.
6014 University Street

ST. LOUIS, MISSOURI
Great Lakes Aeroplane Co.
Great Lakes Aeroplane Co.
Great Lakes Aeroplane Co.

THANK YOU FOR reading AVIATION

At the Hub of the Highways of the Air



DIRECTLY between the principal airports of New Jersey and Long Island, General Motors Building towers, a giant sign post, pointing the way from Broadway, across Fifty-Seventh Street, to where the concrete ribbon of the Queensboro Bridge leads to the fields whence trans-Atlantic hops begin.

Located at the principal point of motorism, with block after block of industries concerned with every type of motor apparatus stretching away to

North and South, General Motors Building is an ideal market for those engaged in this most modern business of making the world air-minded.

Whether you sell tremendous hydroplanes or tiny spark plugs, there is a desirable location in this building just suited to your needs—and at a reasonable rental. In addition to its specific appeal to those in aviation, General Motors Building has these other advantages:

• All trains stop here—the new Eighth Avenue express train to extraneous parts of the building—or you can easily walk from residential Madison.

• REMOVABLE rents in units of from \$40 to \$3,100 sq. feet—lots of light and air.

• THIS location is an internationally known address.

• THE treasury of the world finds its General Motors Building home—one of the leading members of the New York Stock Exchange and other greatest business of professional concern—representing a total capitalization of more than ten billions of dollars.

• TRAINED modern service—plenty of high speed elevators.

GENERAL MOTORS BUILDING
BROADWAY AT 57th STREET

HOFFMANN BUILDING, Inc., Owners

THANK YOU for visiting AVIATION

Please—CIRCLE 9566

AT THE ALL-AMERICAN AIRCRAFT SHOW — APRIL 6—14



THE SPARTAN[®] *Challenger*

Re-created and refined for the sake of beauty, utility and convenience, but retaining its supreme spikiness, the New Spartan G-II—Challenger powered—comes to the Detroit show a distinct factor in the light commercial plane field.



Standard equipment includes: Streamlined Oleo landing gear struts, MAX Bentix wheels and external brakes, booster magneto, compass, air speed and bank and turn indicators, Hamilton sheet propeller and 90x3 inflated till wheel.

An attractive dealer proposition is now open.

SPARTAN AIRCRAFT COMPANY
TULSA, OKLA.
THANK YOU for visiting AVIATION

A Revelation in Air Travel Comfort



The New "ADAPTO" Airplane Chair

PATENTS APPLIED FOR

Made of Steel Tubing; Strongest, Lightest,
Lowest in Price; Made in any Size and Design

JUST recline more or less, or come back to any angle with the body, and The Adapto Chair adjusts itself automatically to the most comfortable position one may desire, even to the reclining position of a couch.

It is "The Chair of a thousand positions." Indispensable for long flights. The ideal chair for any flight.

We shall be very glad to estimate on your requirements.

Self adapting
 Self adjusting
 Self reclining
 No Springs
 to Break
 No Buttons
 to Push
 No Mechanical
 devices to get
 out of order

ADAPTO CHAIR COMPANY

413-415-417 East 36th Street, New York, N. Y.

MAKERS FOR SIKORSKY, BELLANCA, FAIRCHILD, ETC., ETC.

THANK YOU for advertising AVIATION



"THE FLEET"

THE FLEET is an engineering achievement of eight years' experience in the exclusive manufacture of training airplanes. ▲ Known formerly as the Husky Junior, the "brother" of the renowned Consolidated Husky . . . the standard training plane of the Western Hemisphere. . . . The Fleet is acknowledged both by governmental and civilian aviation authorities to be the perfect plane for flying instruction as well as for sport and business use. ▲ Named in honor of Major R. H. Fleet, under whose experienced direction it was originally designed and developed as the Husky Junior, The Fleet is now manufactured and marketed by Fleet Aircraft Incorporated. This new organization, ably headed by Lawrence D. Bell as president, who for fifteen years has been prominently active in the production and sale of aircraft, has launched a program that presents an unusual opportunity for distributors and dealers to share in profits—made possible only by quantity production. ▲ Complete particulars will be gladly furnished on request. Address Fleet Aircraft Incorporated, 2050 Elmwood Avenue, Buffalo, New York.



LAWRENCE D. BELL
President

FLEET AIRCRAFT

THANK YOU for advertising AVIATION

U. S. 1/2-in. Drill
2000 rpm. Lead Speed
\$33

U. S. 1/2-in. Special Drill
2000 rpm. Lead Speed
\$24

U. S. 1/2-in. Special Drill
60 rpm. Lead Speed
\$53

U. S. Buffer and Polisher
3500 rpm. Lead Speed
\$99

U. S. Screw Driver and Nut Setter
400 rpm. Lead Speed
\$48

U. S. Valve Refacer
2 Motors, 300 RPM
\$190

U. S. 6-in. Bench Grinder
3500 rpm. Lead Speed
\$34.50

THE STANDARD OF QUALITY SINCE 1897

Oldest Builders of Electric Drills and Grinders in the World

BRANCH SALES OFFICES
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THANK YOU for visiting AVIATION

THE LEBLOND "90"

The seven-cylinder Leblond, radial-type air-cooled, is the supreme "90" for the maker and user of two-place and three-place commercial planes. It occupies less space; offers a smooth, efficient stream of power; easier to assemble and disassemble due to unit simplicity; costs less to operate; presents less load resistance; offers 90% interchangeability of parts with the Leblond "60".... and is available at once.

Detailed information upon request. Write now.

THE LEBLOND AIRCRAFT ENGINE CORP.,
DEPT. E, CINCINNATI, OHIO, U.S.A.
Gardner Manufacturing Co., C. C. Gardner,
222 North Alameda, Los Angeles, Calif.

A SMOOTH EFFORTLESS STREAM OF POWER

U. S. Department of Commerce
Registration No. 1043

LEBLOND AIRCRAFT ENGINES

Voltage Regulation

developed by

LEECE-NEVILLE

Applied to

**Engine Driven Generators
For Airplanes**

TYPE	VOLTS	AMPERES	R.P.M.
B-1	12	25	2000-3000
C-1	15	50	2000-3000
G-1	15	15	2250-4000
D-1	15	25	2250-4000
E-3	15	50	2250-4000

On Display at

ALL AMERICAN AIRCRAFT SHOW

April 6-14th

CONVENTION HALL

Detroit

Manufactured by

The Leece-Neville Company, Cleveland, Ohio

Savoia-Marchetti world famous flying boats and amphibians to be manufactured in America



MODEL S-18

AMERICAN Aeronautical Corporation will produce time-tested Savoia-Marchetti seaplanes and amphibians under the name of

AMERICAN SAVOIA-MARCHETTI

Two outstanding achievements of these planes are: Commander de Pinedo's sixty thousand mile flight around the world, crossing the Atlantic in both directions and touching six continents.

Commander Arturo Ferrarin's non-stop flight of 4417 miles from Rome to Brazil in July, 1928, in a Savoia-Marchetti S-64,

American Savoia-Marchetti S-56, three-seater baby amphibian.

American Savoia-Marchetti S-62, seven-passenger cabin seaplane or amphibian.

American Savoia-Marchetti S-55, twin-hull, fourteen-passenger tandem-motored, two 500 HP. seaplane.

American Aeronautical Corporation
730 FIFTH AVENUE, NEW YORK CITY
THANK YOU FOR READING AVIATION

WHAT KIND OF HANGAR SHALL WE ERECT?



HERE'S THE ANSWER TO THESE QUESTIONS

Firesafe

**BLAW-KNOX
STEEL
HANGARS**



Blaw-Knox HANGAR owned by the Wichita Airplane Company at Wichita, Kansas. Built entirely of steel.

There's no longer doubt in your mind when you decide on a Blaw-Knox HANGAR—*that it is the answer*. You can move it to a new location—you know it will cost little to maintain because it is built of steel—steel, galvanized steel and offers the utmost resistance to weather and corrosion. It solves all hangar problems of economy and surpasses the future. It is both permanent and portable and gives you a wise investment which will pay you dividends without delay. Ask our nearest district office for complete data.

BLAW-KNOX COMPANY
817 Powers Block Bldg.
WICHITA, KANSAS
Sales Offices: Atlanta, Chicago, Denver,
Honolulu, Indianapolis, Kansas City,

BLAWKNOX

THANK YOU for reading AVIATION



The Ideal Training Plane

Approved Type Certificate No. 105

The Swallow T-P—Approved Type Certificate No. 105—was first presented at the Chicago Show. Its reception by the trade since that time has been truly phenomenal. From the sales already made, it seems certain that more students will learn to fly in this plane than any other type, in 1929.

Swallow has built into the T-P all the well-known qualities for which the Pioner Swallow has been so favorably known for many years.

Quick Take-Off—Slow Landing Speed—100% Visibility—remarkable ease of control in flight—Stability; and above all, a full measure of Swallow sturdiness and ruggedness in construction that means longer life—the ability to stand the hard knocks which students will give it—with Absolute Safety.

In addition to these other features, the T-P offers you other valuable features, including: Students Rudder and Stick Release, crash pads, dependable motor mount (for any motor up to 110 H.P.)—all for \$1795 less motor and prop. at Wichita.

The Swallow T-P, with other Swallow models, will be on exhibition at the Detroit All-American Aircraft Show. See them there. Our representatives will be glad to give you any desired information.

THE SWALLOW AIRPLANE CO.
WICHITA, KANSAS

THANK YOU for reading AVIATION

Whether
Detroit
Chicago
or
New York
it's
Always
a
BENDIX
Show!

BENDIX

AIRPLANE WHEELS AND BRAKES

THANK YOU for visiting AVIATION



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Cotter
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Vought Corsair
U.S. Army Air Corps
(for all ships)
U.S. Navy
(Bureau of Aeronautics)

AVIATION
April 6, 1939

AVIATION
April 6, 1939

Time has Written LAIRD'S best Testimonial



The New Laird Biplane, 1938

FEW AIRPLANES can boast the ancestry of the LAIRD-WHIRLWIND. As long ago as 1912, the first LAIRD biplane was created. It is a far cry from this pioneer of the air-lanes to the modern LAIRD-WHIRLWIND.

LAIRD Airplanes have been in commercial service long enough to be time-tested and proved. One LAIRD-WHIRLWIND on the Chicago-Minneapolis mail route covered upwards of 70,000 miles and was never off the run for repairs of any kind. Other privately owned LAIRD-WHIRLWINDS have been in continuous service, one with a total in excess of 300,000 miles to its credit without major repairs. Recently Chas. ("Speed") Holman of Northwest Airways piloted his LAIRD LC-R from Minneapolis to Chicago, covering the 350 miles in 1 hour and 48 minutes.

The history of LAIRD-WHIRLWIND includes:

- The record nonstop flight between Chicago and New York.
- A cross-continent flight between Wayne, Mo. and Glendale, Calif.
- 1st and 2nd place in the Class "B" 1937 National Air Derby, Elkhorn in Spokane.
- 2nd place in Class "B" 1938 National Air Derby, Glendale, Calif.
- 1st and 2nd place in the Douglas-Cessna Air Derby, September, 1938.

These are high-lights. By consistent performance in government, commercial and private use, the LAIRD-WHIRLWIND has justified a reputation for speed and dependability. LAIRD superior design and LAIRD superior workmanship plus Wright Whirlwind power result in the perfected flying unit.

LAIRD airplanes are built for the commercial buyer whose chief interest is high efficiency and dependability rather than price. We invite such buyers to write for our free booklet and the name of nearest distributor who can arrange a demonstration.



The Newest Laird—
Whirlwind LC-R, 1938

E. M. LAIRD AIRPLANE COMPANY

Ashburn Field—4500 W. 83rd St., Chicago

Laird airplanes are manufactured only by
the E. M. Laird Airplane Co., Chicago, Ill.



DISTRIBUTORS Exclusive territories available for established firms with funds and suitable demonstrating facilities to handle LAIRD sales. Federated factory space and increased production facilities insure prompt delivery.

LAIRD AIRPLANES LEAD THE FIELD

THANK YOU for visiting AVIATION

\$ 25



New
BLACK & DECKER

Quarter-Inch
Light Duty Electric Drill
An unprecedented price for an electric
drill of Black & Decker quality
A strong,
serviceable,
general purpose tool

The Black & Decker Mfg. Co.
Towson, Md., U. S. A.

"With the Pistol Grip and Trigger Switch"



PLANE PERFECTION!

Unparalleled performance by the "Bird" of them all—Just visualize gracefully taking off within one hundred feet with capacity load! Soar through the air at one hundred and twenty miles an hour . . . then an assured leisurely landing at slowly as thirty-five miles an hour. That is the ease with which you can fly this Superior OX5 model. Full details in the "Bird" pictorial booklet—A brochure that takes you through the "Bird" factory with a minute story of the construction of this remarkable plane.

"SAFETY AND PERFORMANCE"

"A few valuable dealer franchises available."

BRUNNER-WINKLE AIRCRAFT CORPORATION
117 HAVERKAMP STREET, BROOKLYN, NEW YORK

The D. H. Gipsy MOTH offers a valuable FRANCHISE to Qualified Dealers



THE Gipsy Moth is already a world-wide success! Its performance, reliability, safety and economy have been proved during the past four years by over 5,000,000 miles of flying. Uses famous 100 horse-power D. H. Gipsy Engine, designed and built by de Havilland, in England, and entering American production by the Wright Aeronautical Corporation in April.

Moth Economy Makes Big Profits for Users

The Moth can be operated for less than \$5.00 an hour, including all charges for depreciation and pilot's time. Folding wings permit storing three Moths in space occupied by single ordinary plane. This economy naturally makes the Moth exceptionally profitable for flying schools, private structures, taxi services and other commercial purposes.

For Training: The Moth is the finest dual instruction plane yet produced. Used in military and civilian flying schools all over the world. Exceptional safety through use of famous slotted wings; unusual visibility; flies equally well from either cockpit; extra sturdy landing gear. Students can pass from Moths direct to practically any other plane without loss of intermediate types.

For Taxi Service: The Moth carries one passenger with pilot

and 200 pounds of baggage at cruising speed of 65-70 miles per hour. Moth economy assures a profit on rates 50% lower than usual.

For Personal Use: The Moth is the ideal plane for the private owner. It is a most comfortable plane to fly. Off the ground in 30 yards; lands and stops in 125. Can be stored in a single heated garage. Uses any gasoline. Equally good for short hops and long cross-country flights.

A Tremendous Market Is Waiting

A Moth sales franchise will be immediately profitable and will constantly increase in value. Territories are rapidly being closed, but many opportunities still exist for qualified Distributors and Dealers. Write now for details—over 3000 of 1929 Moth production is already sold! Or see our representatives at Detroit Show who will demonstrate the Moth and explain the Moth franchise.

Moth Distributors

Metropolitan New York and Northern New Jersey:
Earl L. House, Graybar Building, New York

Northeastern New York: Albany Air Service, P.O. Box 1145, Albany, New York, and Albany Airport

New England: Skyways, Inc., Copley Plaza Hotel, Boston, Mass., and Boston Airport

Ohio and Michigan: Thompson Aeromarine Corporation, 2156 Clarkwood Road, Cleveland, Ohio



MOTH AIRCRAFT CORPORATION LTD.

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MOTH Distributors

The following Distributors are qualified to appoint local Dealers in their territories. They will demonstrate the D. H. Gipsy Moth to prospective Owners and Dealers.

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Graybar Building, New York

Northeastern New York

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Then, why not select your HANGAR—the home of the valuable vehicle—with the same amount of care and with the assurance that you will receive a building which will answer your purpose for a long time to come?

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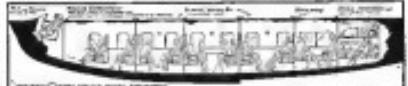
A cargo of 600 pounds of mail and express + 12 passengers + 800 pounds of baggage + pilot + an assistant pilot-mechanic + steward + sufficient fuel to fly 300 miles at a cruising speed well over 100 miles an hour—a pay-load that produces profit.

The main cabin of The Commodore, as illustrated below, comprises five separate passenger compartments—a buffet and a wash room. The control cockpit is in the nose of the hull, connected to the main cabin by a door.

We will gladly furnish complete details and particulars pertaining to The Commodore's adaptability to air transport service wherever there is water—a comprehensive survey showing how The Commodore assures pay-loads that produce profits regularly and consistently.

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The distinctive virtue of the passenger compartment is its spaciousness. Features of interior design include a washroom, a large dining room, a large deck, and a large deckhouse.



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of sun on
the horizon
pours out of
hand — a
feeling into the
distant horizon

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A SENSATIONAL story of SilverTown tire value is told by the latest news from the country's tire experts as they sweep across the continent, deliberately striking out the worn roads and the bumpy going, to demonstrate, as prove again, how good tires behave when you ride on Goodrich Silvertown, the lasting quality of a superior.

The Silver Fleet of 14 shining new cars and our motor truck speeds are way across the country, deliberately striking out the worn roads and the bumpy going, to demonstrate, as prove again, how good tires behave when you ride on Goodrich Silvertown, the lasting quality of a superior.

As impressive as dramatic as this tire demonstration may be to the motorist public, there is a licensed pilot flying today but who at one time or another has

thanked his lucky star that he stepped into, too, the world's most dangerous profession than they will ever be called upon to withstand.

Goodrich Silvertown Airplane tires are bridged with a vein of lightning, with rigid adherence to a long-established Goodrich principle that *Silvertown tires* must resist maximum strain.

They are demonstrating their superiority on the flying fields of the Nation just as surely as the men on the cars of the Goodrich Silver Fleet are demonstrating their superiority over other makes out on the byways of America.

Each Goodrich Silvertown airplane tire and Goodrich Silvertown truck tire is made with a vulcanized power jacketing that is never repaired of them.

GOODRICH has staked out its field in aviation. The realm of *knee-bean-aircraft* is its zone of endeavor. There Goodrich has *permitted* . . . there Goodrich has *won* airplane *Austria*. And there Goodrich still flies with the leaders, with its products as for advanced over others as the modern airplane is advanced over the byways of two decades ago.

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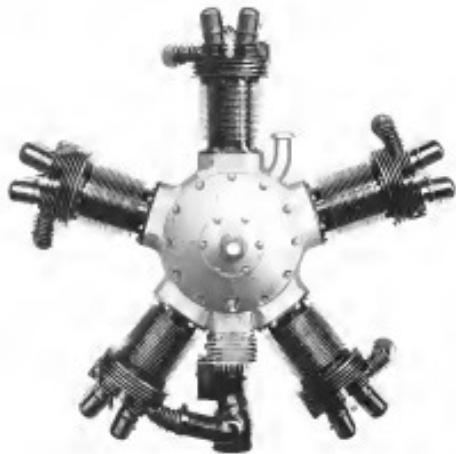
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The Improved Kinner 5 cylinder radial engine brings to the 100 horsepower field standards of production, material and performance comparable in every detail with military power plant requirements.

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Front View of Aristocrat Cabin Monoplane
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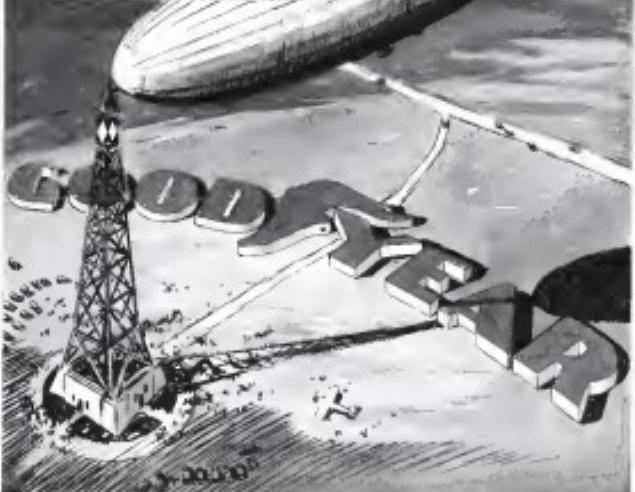
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"Flight From Nome Finished In Dark" . . .

"Next Wien Will Make Trip To Siberian Coast" . . .

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From Alaska to the Tropics the Hamilton Metalplane is serving faithfully in the cause of commercial flying. It has brought new speed, new comfort, new romance into the field of air travel. It has magnified man's faith in flying by establishing a new standard of safety.

The Hamilton Metalplane is built entirely of Alital, non-corrosive duralumin. It embodies all features of good airplane value. It is a fire-resistant . . . weather-proof and rust-proof. It has tremendous power in reserve. It has a known margin of safety. It is economical and air worthy.

Write for full details of this remarkable transport of the air . . . or if you can, see it at the Detroit Show. Hamilton Metalplanes are furnished with either Pratt & Whitney "Wasp" or "Hornet," depending upon individual requirements. They may be fitted for either land or sea travel . . . and are quickly convertible for either type of service.



The picture above illustrates the Boeing Metalplane Division of the Boeing Airplane Company, Seattle, Wash., which is engaged in the manufacture of the Metalplane for the Alaska market.



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Two seats, including observer	240 sq. ft.
Observer seat	60 sq. ft.
Fuselage and Fins	112 sq. ft.
Wings	360 sq. ft.
Span of Upper Wing	31 ft. 6"
Span of Lower Wing	32 ft. 6"

PERFORMANCE

High Speed—(full load)	225 m.p.h.
Cruising Speed—(full load)	95 m.p.h.
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Draggability	Good
Pel. Load—4 passengers	1,250 pounds
	800 pounds

Watch for the New Standard training plane—a sturdy little monoplane, powered with American Cirrus engine and low in price. Write for details.

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Many good pilots have given testimony to their great satisfaction with this oil; so, to assure thee of getting it in all thy needs, the refiner has established more than 300 distributing warehouses, and engaged 800 dealers to serve this continent, and then, from Coast to Coast.

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[The Robertson family at the Detroit Show will be present to answer all questions concerning aircraft developments in supplies and accessories—and to pass the time of day.]

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F & A Photo

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These daring pilots who have pioneered aviation, whose epochal flights have had great influence upon the advancement of aviation, knew well the necessity for unfailing performance of fuel and lubricants.

In the planes of many of these pilots, in commercial planes and in the air mail service Standard Aviation Gasoline and Stanoil Aero Oils have made an enviable record of performance. With thousands of flying hours to their credit never has there been a single engine failure traceable to faulty combustion or improper lubrication.

Today Stanoil Aero Oils and Aviation Gasoline are well known and preferred by midwestern pilots. These men know they can rely on the supreme quality of Stanoil Aero Products as their best insurance against engine trouble.

Stanolind Aviation Gasoline and Stanoil Aero Oils are on sale at most flying fields throughout the Middle West.

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Setting the whirlwind pace

Crossingly enough, competition has definitely strengthened the Bellanca position. Originality of design and unmatched efficiency long ago earned Bellanca Aircraft a distinct reputation that is now all the greater for the increasing number of records over which Bellancas have so steadily and consistently maintained their leadership.

Bellanca

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The Bellanca distributor network is sound and liberal—a foundation of strength for the distribution of Bellanca aircraft—so it is no coincidence of personal ingenuity or his brother's Bellanca distributors are backed by a really sound and capable network of manufacturing plants and sales agencies throughout the U.S.A. A progressive sales policy provides distributor and distributor with practical sales co-operation. This includes a plan of local advertising and helped that the Bellanca advertising campaign is organized on a national basis. Write us now for full particulars.

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 write to: Bellanca Aircraft
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Capt. F. M. Hawks, Feb. 4th, starting his record-breaking Los Angeles-New York hop in Lockheed "Air Express" equipped with Pratt & Whitney "Wasp." Time 18 hr. 21 min. 59 sec.

—and the STANDARD STEEL PROPELLER used on the Lockheed "Air Express" can be inspected at the Exposition

At the Second Annual All-American Aircraft Show at Detroit will also be displayed a three-bladed propeller suitable for use on Pratt & Whitney "Wasp" Engine, several Standard propellers for Wright "Whirlwind" Engines, Curtis OX-5 and for other lower powered engines.

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Standard Steel All Metal Propellers—first developed in 1919—may be obtained for engines rated at ninety to six hundred horsepower.

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for high and
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ASSUMING the selection of a route and terminals capable of providing enough business to make the work profitable, three things are essential to successful air transport service. These are safety, regularity, and comfort.

The class of planes to fly the routes, therefore, boils down to determining which are most certain to provide these essentials. And we believe any comprehensive study of the field must include the Ford tri-motor all-metal transport monoplane, which seats ten to fourteen passengers and has a cruising radius of five hundred miles.

Safety demands reliability of power plant—and that's why the Ford plane's power is divided into three units, any two of which will keep it going. There's room for safety. There's room too, for regularity. A clocked jet, a duty dashhouse, a fast, timed spark-plug can't force the Ford plane down short of its normal.

Safety likewise demands complete ground control of the plane, especially for short fields. To provide it, the Ford plane has independently operated brakes which give maximum control of the plane on the ground even when racing across stiff winds.

Regularity demands a plane that is on the job day after day, in perfect condition for work. That's why the Ford plane is built mostly of metal—not a spark of wood or a square inch of fabric in its structure. Nothing is warp out of alignment, nothing to split or tear or parts. A peculiar thing about durability is this: The longer the plane is in service the newer it looks—constant sealing and rubbing down give it a high polish. It is exact-proof, of course.

Perhaps the best evidence of the Ford plane's regularity is its name. Over a period of more than three years in daily operation as the Ford air routes, the schedule has been maintained with an efficiency of better than fifteen per cent!

Comfort! Musical motion in three stages, in the further enjoyment of metal, in the plane's size and stability. Physical comfort in an enclosed cabin with glass glazing windows which can be opened for ventilation or in the efficient heating system which provides comfort in winter. Comfortable seats. Metal engine noise. The conveniences of a luxury!

Consider the Ford plane carefully for your transport service. Write us for any information about it via my desk.

THE STEEL METAL AIRPLANE COMPANY

Division of

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THE conditions to which piston rings must be subjected in aircraft use are far more exacting than any others.

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For many years, U. S. Hammered Piston Rings have been accepted as standard for aeromarine purposes. They played their important parts in carrying Lindbergh to Paris and they have likewise functioned perfectly in dozens of other historic flights of primary importance, including those of the other pilots mentioned above.

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